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ABSTRACT

The birds of Illinois and their particular habitats are explored in this guide which is a part of a series of Nature Discovery publications. The materials are designed to directly supplement the natural science curricula and to complement other subject areas including social studies, language arts, music, and art. The program is formated for students in a self-directed and participatory manner. The chapter introductions and individual exercises address the students directly. Exercises appropriate for indoor use bear a "Classroom Discovery" emblem, while outdoor activities are designated with an "Outdoor Discovery" emblem. A system of tallying points is offered at the conclusion of the activities. A teachers guide is provided and contains suggestions for each of the five student chapters. The themes of these chapters are: (1) preparing a discovery manual (focusing on the terms and concepts basic to the study of avian ecology); (2) building bird field guides (examining the processes of bird identification and habitat adaptation); (3) nature sleuthwork (including simulated and actual field investigations); (4) making environmental decisions (reviewing problems involving birds and other wildlife); and (5) nature discovery poster (providing a song about birds, a bird model, and a plan for constructing a nesting box). Pen and ink illustrations are offered throughout the document. (ML)

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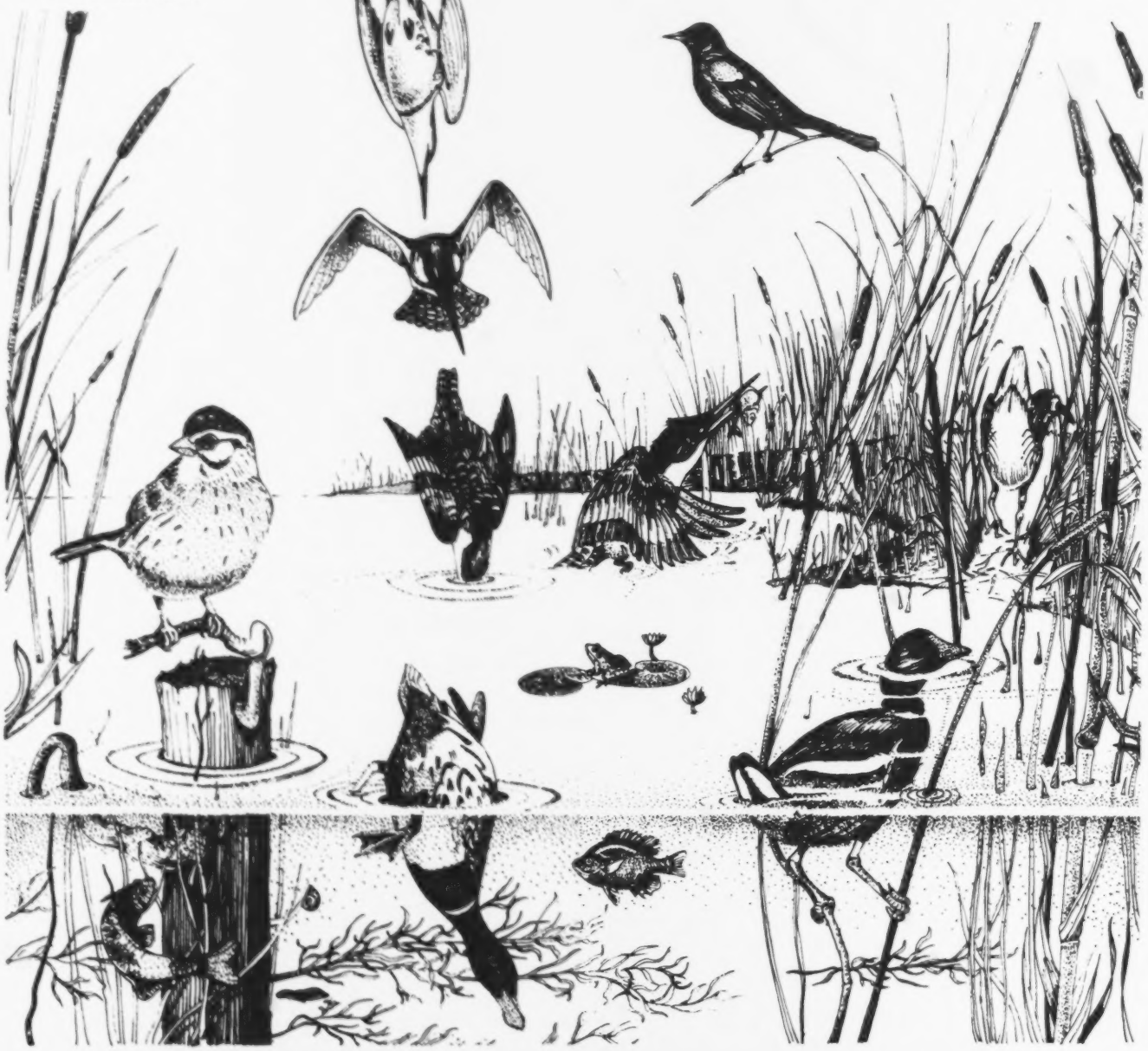
NATURE DISCOVERY I

"Illinois Birds"



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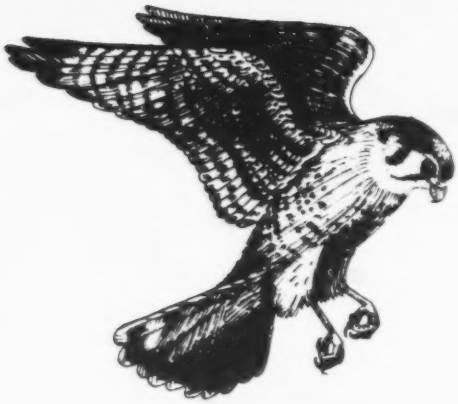

NATURE DISCOVERY I

This edition of **Nature Discovery** is an exact reproduction of a previous edition sponsored by the Illinois Department of Conservation. Although this edition was produced independently by the Nature Discovery Press, the Nature Discovery educational series is approved by the Illinois Department of Conservation. Therefore, to maintain the continuity of the Nature Discovery program in Illinois, certain materials within this workbook bear reference to the Illinois Department of Conservation.

Written and Designed by Sally F. Stone
Illustrated by Sheila H. Gilligan
Activity Poster Illustrated by Robert F. Eschenfeldt

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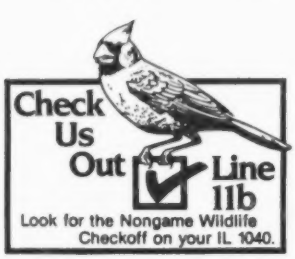

Nature Discovery is endorsed by the following organizations as a valuable program for teachers and students seeking to learn more about Illinois' natural heritage. Teachers are encouraged to write to each of these organizations to obtain more useful conservation education materials.

Illinois Department of Conservation
Division of Natural Heritage
524 S. 2nd St., Springfield, IL. 62706

National Audubon Society
950 Third Avenue
New York, NY 10022

Environmental Education Association of Illinois
281 S. Chana Rd., Chana IL 61015

ILLINOIS department of **AGRICULTURE**
Illinois State Fairgrounds, Springfield, Illinois 62706

Illinois Environmental Protection Agency
2200 Churchill Rd.
Springfield, IL 62706

Illinois State Board of Education
100 N.First St., Springfield, IL 62777

Illinois Environmental Council
206 South Sixth Street, Springfield, IL 62701

Open Lands Project
53 West Jackson Boulevard
Chicago, Illinois 60604
Telephone 312-427-4256

United States Department of the Interior
FISH AND WILDLIFE SERVICE

NATURE DISCOVERY I
"ILLINOIS BIRDS"

Greater Prairie Chicken

Nature Discovery is dedicated to the youngsters of Illinois, the future guardians of our natural heritage.

HOW TO USE NATURE DISCOVERY I

If you are a student: You can begin your study of Illinois birds by turning to Chapter 1 on page 1. The information and instructions you need to launch your quest for discovery are explained in full detail.

If you are a teacher: The information and instructions your students need to complete Nature Discovery I are described within this workbook. You may find it helpful, however, to review the Teacher Guide presented over the next three pages.

CONTENTS

Teacher Guide ..... IV-VI

Message From The Publisher ..... VII-VIII

1. **Preparing a Discovery Manual** 1
   - Defining Discovery Terms
   - Preparing a Flight Guide
   - Creating an Adaptations Guide
   - Building a Nest Guide
   - Observing Birds in the Wild

2. **Building Your Bird Field Guides** 13
   - A Field Guide to Forest Birds
   - A Field Guide to Open-Country Birds
   - A Field Guide to Freshwater Wetland Birds
   - Adding Onto Your Field Guides

3. **Nature Sleuthwork** 27
   - An Imaginary Field Trip
   - Taking Outdoor Field Trips

4. **Making Environmental Decisions** 39
   - Resolving Environmental Dilemmas
   - Comparing Environmental Decisions and Opinions

5. **Working With the Nature Discovery Poster** 45
   - Illinois Is A Home Address For:
   - If I Were A Bird (song)
   - Building a Flying Bluebird Model
   - Constructing a Bluebird Nesting Box

Nature Discovery I Certificate of Achievement 55

Enclosure

The Nature Discovery Activity Poster:

The poster, "Illinois Is A Home Address For:" is meant to be a "build it yourself" project. The information and instructions necessary to complete the poster are presented in Chapter 5 of the workbook.

TEACHER GUIDE

Purpose and Theme

Nature Discovery is a creative education series designed to help children understand and appreciate the natural resources of Illinois. Through understanding, children can best develop the skills they will need to safeguard the environment in the future. This premier edition of Nature Discovery features the avian life flourishing in the forests, open areas, and wetlands of Illinois. It is a quest for discovery we hope your students will find enriching and enjoyable.

Curriculum Integration

To meet the diverse needs of the classroom teacher, Nature Discovery is designed to directly supplement natural science curricula while also complementing other subject areas including social studies, language arts, music, and art. Additionally, the individual activities are formulated to engage students in a broad spectrum of skill development. Students are continually challenged to interpret, synthesize, and augment the information presented, thereby allowing them to use their own ingenuity in crafting skills ranging from visualization to analysis, imagination to problem-solving, media construction to oral presentation.

Organization of the Materials

The diagram below shows the thematic organization of Nature Discovery I. At the core of the program, Chapters 1—3 are designed to help students build a well-rounded understanding of avian ecology. Students can then work as informed environmental decision-makers in Chapter 4. Chapter 5 includes several special projects but is designed primarily to accompany the activity poster. ***It is important to note that Chapter 5 and the activity poster are especially prepared to accomodate K—3 teachers and students.***

Exercise Format

Nature Discovery is intended to be a program of self-directed, participatory learning for your students. The chapter introductions and individual exercises speak directly to students, enabling them to work either as a class or individually. Exercises appropriate for indoor use bear a "Classroom Discovery" emblem, while outdoor activities are designated with an "Outdoor Discovery" emblem.

To make the students' experience as active as possible, each exercise is presented as a quest that can be undertaken to build a body of knowledge. In many cases, students are then challenged to use their own work as reference while completing other exercises. Students can track their progress by tallying the discovery points we have assigned to the individual exercise (as explained in the chapter introductions).

Grade Level Appropriateness

Grades 4—8: The Nature Discovery materials are designed to be completed by students in grades 4 through 8 without significant teacher adaptation. Teachers may wish to review, however, the section, **"Background Information By Chapter,"** where suggested exercise variations and related projects are discussed.

Grades K—3: The Nature Discovery Activity Poster and the activities accompanying it in Chapter 5 are especially designed for use in grades K—3. The outdoor activity "Observing Birds in the Wild" in Chapter 1 is also appropriate for younger students. The remainder of the materials do require teacher adaptation. In general, we recommend approaching the exercises as class projects. Specific formats that can be used to adjust individual exercises to the skill level of younger children are described in the next section, **"Background Information By Chapter."**

WORKBOOK CHAPTERS

1. Introduction to the study of birds; provides conceptual reference for remainder of workbook.

2. Species identification and habitat ecology; integrates concepts explored in Chapter 1.

3. Application of skills and concepts in Chapters 1 and 2; culminating in study of ecosystem dynamics.

4. Environmental decision-making from an informed vantage point; extends into analysis of human values and opinions.

5. A simplified study of birds revolving around the activity poster and special projects.

BACKGROUND INFORMATION BY CHAPTER

This section includes supplementary information, exercise variations, and related project ideas that teachers may find useful. The exercise variation and project descriptions include a recommended grade level (shown in parenthesis) and the Nature Discovery activities within that chapter *(as shown in italics)* that are appropriate for use or reference.

Chapter 1: Preparing a Discovery Manual

This chapter focuses on the terms and concepts basic to the study of avian ecology and includes a simple outdoor observation activity. The completed Discovery Manual is a body of reference students can use while working with portions of Chapters 2, 3, and 5.

Exercise Variations and Related Projects (Chapter 1)

Food Web Models and Mobiles: (K—8) *Use as reference the discovery terms photosynthesis, food chain, and food web in the exercise "Defining Discovery Terms."* Food Web models can be created on sheets of paper, on bulletin boards, or in the form of mobiles. The plants and animals illustrated throughout the workbook can be used as characters in the webs. K—3 teachers can simplify this activity by working with the actual information accompanying the discovery terms, food chain and food web.

Nest and Beaks and Feet Flash Cards: (K—4) *Use as reference the illustrations in the Adaptations and Nest Guides.*

Flight Maneuvering: (K—4) *Use the Flight Guide as reference.* Ask students to describe and actually imitate the different maneuvers birds execute during flight (soaring, flying, hovering, diving, landing, taking off, etc.). Throughout the workbook, you will find illustrations of birds performing many of these actions.

Migration Maps: (6—8) *Use as reference the discovery term "migration" and the accompanying range maps in "Defining Discovery Terms."* Ask students to create and describe maps showing the migratory routes of individual bird species. Students can find reference material in commercial field guides (see the background information for Chapter 2).

Chapter 2: Building Your Bird Field Guides

This chapter examines the process of bird identification and focuses on the ways in which representative birds adapt to the conditions within specific habitats. Students are encouraged to use their own completed field guides in conjunction with commercial field guides. Three of the most useful guides are:

National Geographic Society Field Guide to the Birds of North America edited by Shirley L. Scott (National Geographic, 1983)
Birds of North America, exp., rev. ed., by Chandler S. Robbins, Berkel Braun, and Herbert S. Zim (Western Publishing Company, 1983)
A Field Guide to the Birds East of the Rockies, 4th ed., by Roger Tory Peterson (Houghton Mifflin Company, 1980)

Exercise Variations and Related Projects (Chapter 2)

Coloring Birds and Habitats: (K—3) *Students can color the birds in the field guides and the large habitat illustrations depicted on the first page of each field guide.*

Bird Flash Cards: (K—3) *Use The birds in the field guides.* For younger children, it is not necessary to recognize and label all of the key field marks to successfully match the bird illustrations with the descriptions. One field mark will do!

Birds of Illinois Bulletin Board: (K—8) *Use the birds in the field guides.* The birds can be arranged by habitat. Caption each bird with details of its natural history such as coloration, size, feeding and nesting habits, special adaptations/features, etc. Students can also prepare oral reports and/or stories about the birds.

A Bird Sing-Out: (4—6) *Use the bird descriptions in each field guide.* Ask students to imitate the voices of the birds described. Students can then try to identify the birds based upon the vocalizations of their classmates.

Bird Recordings: (6—8) An ordinary portable tape recorder, especially one with manual controls, can be used by students to record bird and other wildlife sounds in the outdoors. Ask students to carefully note the movement and positions taken by the birds they are recording. They may be able to monitor a bird setting the boundaries of its territory. Students also can learn a great deal about recognizing birds by song by listening to commercial records and by viewing videos. Two resources we recommend are:

The Peterson Field Guide Series: A Field Guide to Bird Songs of Eastern and Central North America, 2nd ed., produced by James Gulledge (Houghton Mifflin Company, 1983).
Watching Birds with Roger Tory Peterson, a video by Allen H. Morgan (Metromedia Producers Corporation and Houghton Mifflin Company, 1981).

Chapter 3: Nature Sleuthwork

This chapter includes simulated and actual field investigations, both stressing the observation and analytical techniques necessary to build an understanding of birds and their habitat communities. When working with the classroom activity, "An Imaginary Field Trip," teachers can refer to the following key to the identity of the twelve mystery species: 1. brown-headed cowbird; 2. killdeer; 3. short-eared owl; 4. green-backed heron; 5. pied-billed grebe; 6. bald eagle; 7. red-eyed vireo; 8. pileated woodpecker; 9. rose-breasted grosbeak; 10. wood thrush; 11. broad-winged hawk; 12. great horned owl.

Following completion of the imaginary field trip, we recommend engaging students in a discussion of the species and concepts presented. Specific topics appropriate for discussion include: courtship; nest comparisons; the care, development, and defense of young; food-gathering techniques; predator-prey relationships; habitat features; and the interactions occuring between the various physical and living components within ecosystem communities.

Exercise Variations and Related Projects (Chapter 3)

An Adventure Story: (K—3) *Use the Imaginary Field Trip.* This exercise can be read as an adventure story to younger students. The teacher can reveal the identity of the mystery species or have the students pick the

correct species out of a possible two or three choices. The species students are to choose from can be posted on the blackboard as the story is read.

Writing Field Trips: (4—8) *Use the Imaginary Field Trip.* Students can write their own field trips using the Nature Discovery field trip as a model and the birds in the field guides as possible mystery species. The activity will probably work best if students write their stories in the first person narrative.

Ecosystem Models and Murals: (4—8) *Use as reference "Part 6 - Ecosystem Drawings" in the activity, "Taking Outdoor Field Trips."* The guidelines presented in this activity can be used as a step by step procedure to "build" and "activate" a working ecosystem. Using a wide range of materials, students can construct ecosystems on bulletin boards, walls, table tops or in boxes. Actual mini-ecosystems also can be created in the form of terrariums and aquariums.

Chapter 4: Making Environmental Decisions

This chapter introduces students to some of the environmental problems involving birds, other wildlife, and the environment as a whole. Students then work as decision-makers to resolve simulated environmental dilemmas. During this process, the students are asked to make decisions most in accordance with their own personal beliefs and opinions. However, since some of the possible resolutions to certain dilemmas are against federal and state laws, the students are encouraged to research the legality of the options they choose.

In regard to state and local laws protecting birds, we suggest contacting the **Illinois Department of Conservation, Division of Law Enforcement, 524 South Second Street, Springfield, IL.**

Most migratory birds, including songbirds, also are protected by federal law and through international treaties. This is just one of the means by which we try to keep bird species from becoming endangered or extinct. Students may wish to refer to section 703 of the **Migrating Bird Treaty Act** which states in part, "...it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export any migratory bird, any part, nest, or eggs of any such bird, or any product..." The legal jargon goes on and on. **The bottom line is, don't mess with the birds, nest — or eggs.** There are exceptions, of course. For example, Federal permits may be issued to collect nests, eggs, etc. for scientific purposes and, under the duck stamp provisions, controlled migratory waterfowl hunting is permitted.

For additional information on federal wildlife laws and regulations you can contact:

U.S. Fish and Wildlife Service
Federal Building
Fort Snelling
Twin Cities, MN 55111

Exercise Variations and Related Projects (Chapter 4)

The K—3 Decision Maker: (K—3) *The first five Decision Situations in "Resolving Environmental Dilemmas" are appropriate for younger students.*

Interview Interpretation and Analysis: (4—8) *Use the out of classroom assignment, "Comparing Environmental Decisions and Opinions."* In this activity, students interview persons for the purpose of comparing environmental opinions. The activity can be extended by asking students to analyze and orally present any conclusions they may have reached as a result of the interviews. Possible themes they could address include: Do most people believe their own personal decisions and actions can influence the overall well-being of the environment? When an environmental decision needs to be made, what factors do most people focus upon as priorities? In what ways do people see their personal well-being as tied to, or divorced from, the well-being of the environment? What are some of the things people are willing to do to help care for wildlife and the natural environment?

Environmental Solution-Seeking: (6—8) *Use the introduction to Chapter 4, "Environmental Decision-Making."* Ask students to research and present reports describing major environmental problems. Students should focus on the impact of those problems upon wildlife and people, and possible solutions available to alleviate the problems. Suitable topics include the following: habitat destruction, human over-population, poor water use management, acid rain, inadequate toxic waste disposal, pesticide poisoning, illegal shooting, and black market trading of wildlife and wildlife products.

Chapter 5: Working With The Nature Discovery Poster

This chapter includes exercises designed to help students complete the Nature Discovery Poster. Also included in the chapter is a song about birds, a cut and paste bird model, and a plan for constructing a bluebird nesting box. **Most of the materials are especially designed to meet the skill level of the youngest students.**

The numbered species on the activity poster are as follows: 1. bobwhite; 2. American redstart; 3. eastern bluebird; 4. barred owl; 5. American kestrel; 6. belted kingfisher; 7. red-breasted merganser; 8. barn swallow; 9. Canada goose; 10. brown thrasher.

Exercise Variations and Related Projects (Chapter 5)

A "One Day in the Wild" Story: (2—6) *Use the poster and the poster bird descriptions in Chapter 5.* Ask students to envision themselves spending a day in the scene depicted in the poster. Have them tell a story about the birds and events they witnessed.

Poster Creations: (4—8) *Use the poster, the accompanying information in Chapter 5, and the bird field guides in Chapter 2.* Using the Discovery poster materials as a model, ask students to create their own posters with the birds illustrated in the field guides.

A Message From The Publisher

Dear Teacher:

The Nature Discovery Press is proud to present **Nature Discovery I - "Illinois Birds"**. The Illinois Department of Conservation has purchased 20,000 copies of Nature Discovery, and these are now available free of charge to Illinois teachers. Due to high demand, however, the Department of Conservation must limit the distribution of Nature Discovery to one copy per classroom.

Now for the first time, teachers can order classroom sets of the Nature Discovery workbook directly from the publisher. Each 64 page workbook is available for just $.85. This low price is designed to save teachers significant copying expense and time. If you would like to order individual copies of the Nature Discovery workbook, please complete the order form below and return it to the Nature Discovery Press at the address shown.

One final note. If you have any suggestions or comments concerning this edition or future editions of Nature Discovery, please send them along with the order form below. Thank you and we look forward to hearing from you.

Sincerely,

Sally F. Stone
President and Publisher
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Chapter 1: Preparing A Discovery Manual

Dear Student:

Your quest in this workbook is to discover nature. The focus of your exploration will be birds and their natural habitats. The discoveries you make will help you to understand the natural conditions birds need to carry on their lives. The more we all can learn about birds, the better we will be able to care for the environment in such a way as to safeguard their existence and ours.

The indoor activities in this workbook bear a **"Classroom Discovery"** emblem. At the end of each chapter, you will find outdoor activities designated with an **"Outdoor Discovery"** emblem. When you go outdoors to conduct these investigations, try to work as quietly and secretively as possible. Otherwise, you may frighten the birds and other animals you are seeking to study. By blending into their environments, you will have the best chance of learning how birds go about their normal, often fascinating, activities.

The **Discovery Manual** you will be putting together in this chapter will be a handy reference you can use to complete all the indoor and outdoor activities. Preparation of your Discovery Manual will begin with an examination of the important terms we use to describe the habits, features, and natural habitats of birds. As you proceed, you will be putting together guides both to the features birds have developed for flight, and the special beak and foot adaptations they have developed to gather food. You also will be creating a guide to some of the most common types of nests built and used by birds.

To help you keep track of your progress, we have assigned a point value to each of the activities in the workbook. In the first chapter, there are four indoor activities, each worth 100 Classroom Discovery Points. If you want to earn some Outdoor Discovery Points, you can tackle the activity "Observing Birds in the Wild." In the Discovery Emblem shown at the beginning of the exercise, record the points you score with each exercise. Tally up your total points for this chapter in the box below. Later, when you have completed all of your discovery work in all five chapters, record your grand total points in the space provided in the **Discovery Certificate of Achievement**. And please remember, always record Discovery Points in pencil. That is because your quest for nature can be an endless one, full of puzzling mystery and exciting discovery.

Chapter 1 Tally Box

TOTAL CLASSROOM DISCOVERY POINTS _____

TOTAL OUTDOOR DISCOVERY POINTS _____

GRAND TOTAL • _____

CLASSROOM DISCOVERY POINTS ____

Defining Discovery Terms

YOUR QUEST

Discover the meaning of the biological terms used to describe birds and the natural environments in which they live.

INSTRUCTIONS

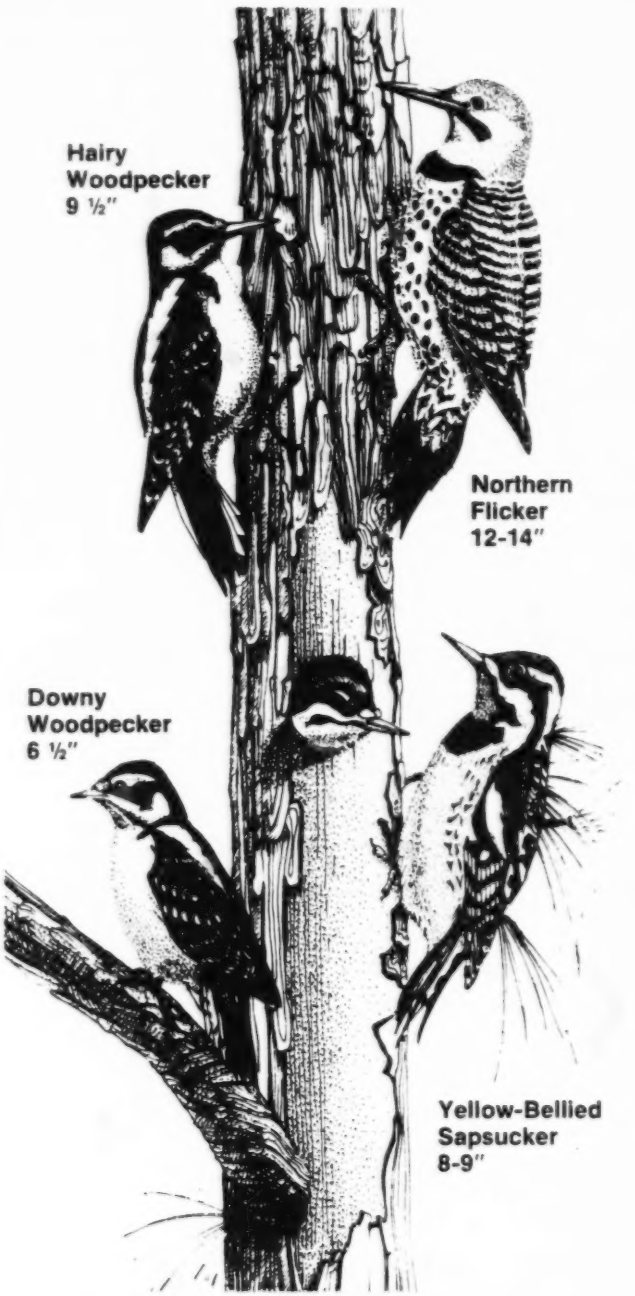
Defined on this page and on pages 3 — 5 are nine discovery terms you will need to know to understand the lives of birds. As you study each discovery term, fill in any blanks and answer any questions presented.

DISCOVERY TERMS

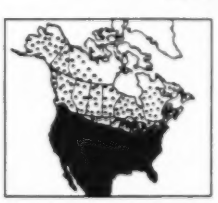
1. **SPECIES:** Each particular kind of bird is known as a **species**. In the illustration to your right, four different species are shown. All of these species belong to the woodpecker family but no two of them are exactly alike. In most cases, only birds that are the same species can mate and raise young. Look carefully at these woodpeckers. On a separate sheet of paper, describe the ways that each woodpecker is different from the others.

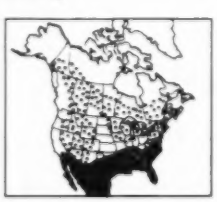
2. **RANGE:** The geographic area where a bird species may be found is called its **range**. The northern flicker, for example, may be found in a range that extends across the entire United States and most of Canada. The range of the yellow-bellied sapsucker is not quite as large. The sapsucker's range does not include the areas of the United States and Canada that border the Pacific Ocean. Yellow-bellied sapsuckers also are not commonly found in some of the areas in the midwestern United States. Label the range map below that most accurately portrays the range of the yellow-bellied sapsucker. Then label the map that shows the range of the northern flicker.

3. **MIGRATION:** Some species live in the northern part of their range during the spring and summer breeding season (the time when birds mate and rear their young) and then **migrate** to southern areas for the rest of the year. By migrating, birds are able to live in several different areas during the times of year when the climate and food supply are best. Look carefully at the range map of the yellow-bellied sapsucker. One area is solid black, and the other is finely dotted. The dotted area is where sapsuckers spend the _____. The black area is where sapsuckers spend the _____.



RANGE MAPS





4. **HABITAT:** Within its geographic range, the type of natural environment a bird lives in is called its **habitat**. For example, short-eared owls live in open, grassy habitats while screech owls live in forested habitats. Each bird's habitat provides it with the things it needs to survive — food, shelter, and water. In what type of habitat do the woodpeckers on page 2 live?

_____

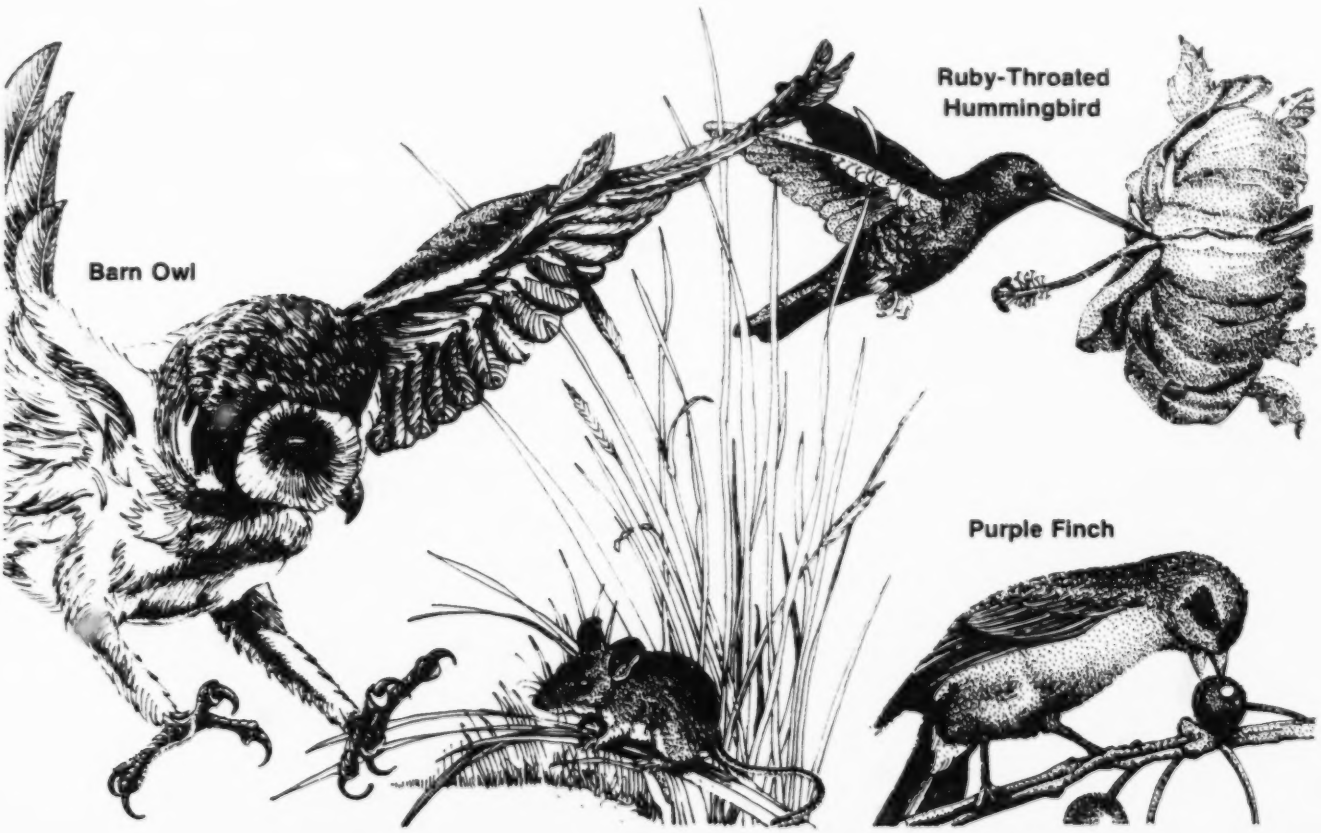
5. **ADAPTATIONS:** For millions of years, birds have been developing the physical features and behavior they need for their special ways of life. Look at the physical features woodpeckers have developed. Their feet, with two sharply clawed toes in front and two behind, are just right for climbing trees. For chiseling into wood and picking out insects, they also have a very useful tool — a pointed, sharp, and sturdy beak. Because woodpeckers use their beaks and feet to "adapt" or make a living in their habitat, these special features are called **adaptations**. Like woodpeckers, all birds have developed special adaptations to help them survive in their habitats. In the illustration at the bottom of this page, three birds are shown gathering food. From what you can see in the illustration, do the three birds have the same kind of adaptations woodpeckers have? _____ Are their feet suited for climbing the sides of trees? _____ Are their beaks suited for chiseling into wood? _____ What adaptations have the three birds developed? To answer that question, review the list of adaptations below. On the blank line in front of each set of adaptations, write the name of the bird in the illustration that has those adaptations.

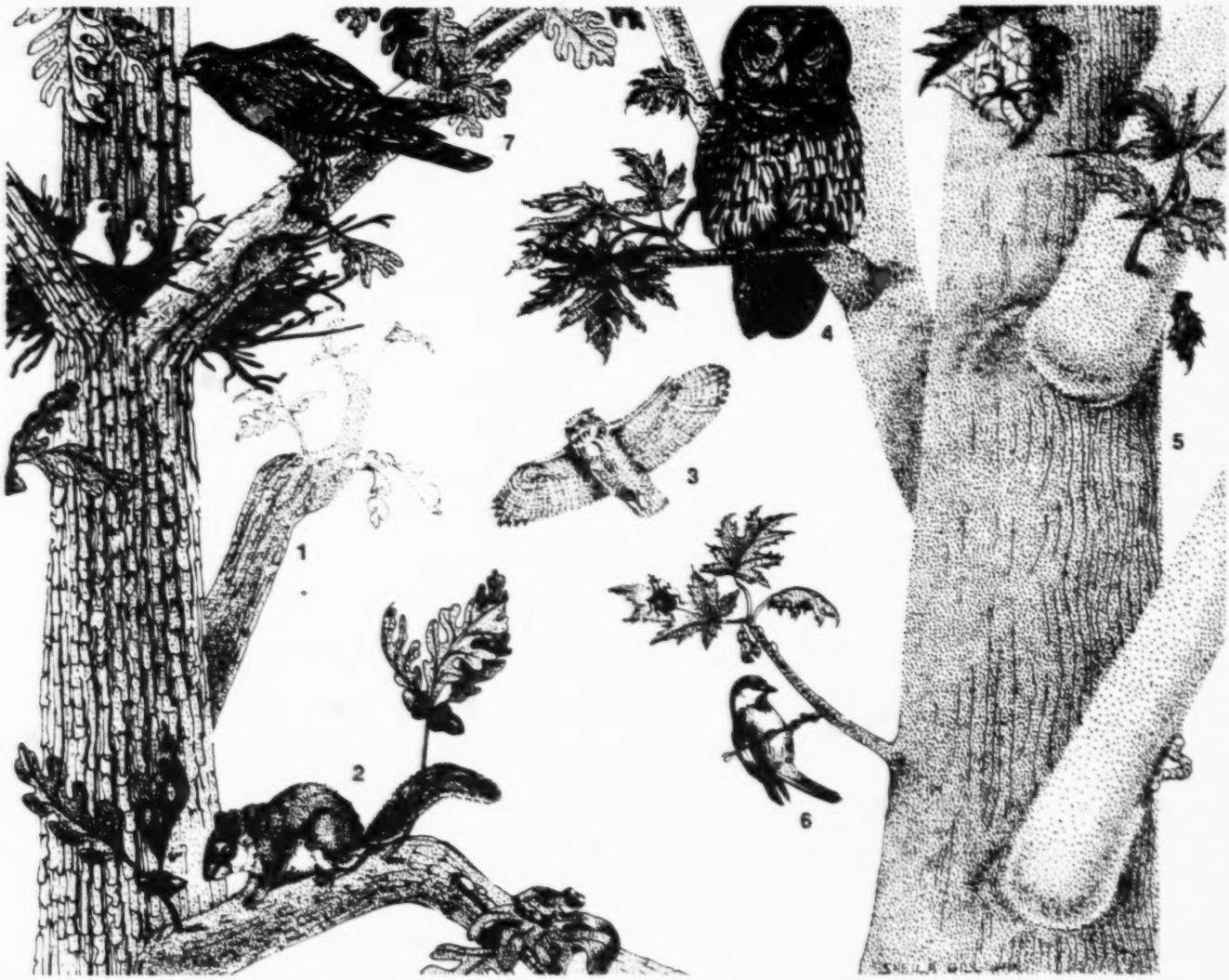
Adaptations

_____ strong, powerful feet equipped with razor- sharp talons — an effective tool for seizing and carrying prey animals; **PLUS**, uniquely designed ears and eyes sensitive enough to detect the quiet movement of animals on dark nights.

_____ a long, thin, straw-like beak that can be used to extract nectar and insects from the inner parts of flowers; **PLUS**, incredibly strong chest muscles and specially shaped wings — a combination that allows this bird to hover in mid-air as it feeds. This bird can actually beat its wings up to **50 times per second!**

_____ a stout, sharp, cone-shaped beak that is especially useful for plucking and crushing fruits, buds, and seeds; **PLUS**, small, flexible feet that are useful for perching and moving along slender branches and stems.





6. **ECOSYSTEM:** Birds do not live alone in their habitats. They share their habitats with other animals and plants. All of the plants and animals living together in a habitat form a type of community. The community is supported by the physical features of the habitat — the soil, water and air. Together, the living community and the physical features make up an **ecosystem**.

Within an ecosystem, the plants and animals interact with each other and with the physical environment. For example, the plants and animals interact all of the time with the soil, water, and air. These are the sources of most of the nourishment, oxygen and space they need to survive. Plants and animals also interact continuously with each other. For example, animals use plants for food and shelter. In turn, plants need certain animals to spread their seeds and pollen.

With the different parts of an ecosystem working together, an ecosystem is a self-supporting community of life. That is why every part of the physical environment and every plant and animal species is very important if an ecosystem is to continue. To better understand why everything in an ecosystem is a valuable part of the community, look carefully at the illustration above. In the illustration, a part of a forest ecosystem is shown. As you work with the next three discovery terms, you will be learning about how the plants and animals in a forest ecosystem interact to exchange food energy. But for right now, use the forest ecosystem illustration to help you answer these questions.

A. Would the animals in a forest ecosystem be able to survive without the trees? _____ Explain your answer on a separate sheet of paper.

B. Would the larger animals in a forest ecosystem be able to survive without the smaller animals? _____ Explain your answer on a separate sheet of paper.

C. Would the trees and other plants in a forest ecosystem be able to grow

successfully if the soil, water and air were to become severely polluted? ____ Explain your answer on a separate sheet of paper.

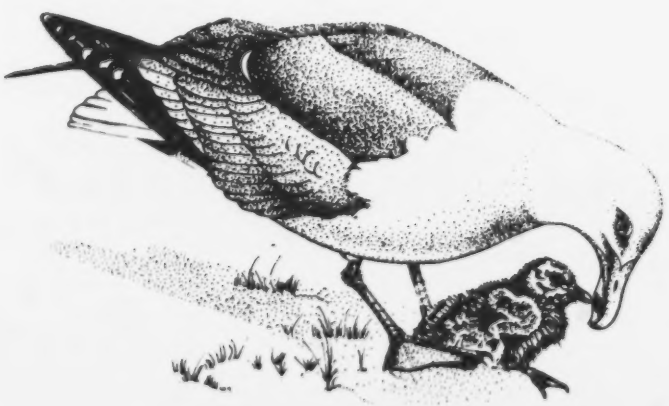
D. If there were no animals in a forest ecosystem, which of the following would most likely occur? (Check off one, two, three, or four of the options.) ____ the rest of the ecosystem would continue as normal. ____ certain trees and other plants would not be able to reproduce as well because there would be no animals to spread their pollen and/or seeds, nuts and berries. ____ the soil would become less fertile because there would be no decomposing animal bodies or waste products. ____ certain trees and other plants would suffer because animals stimulate plant growth when they feed on buds, leaves and fruits.

7. **PHOTOSYNTHESIS:** Plants produce the first food in an ecosystem through a process known as **photosynthesis**. Using sunlight as energy, plants combine water and carbon dioxide in the presence of chlorophyll to make glucose or food molecules. These food molecules are used by plants to grow and are stored in their roots, stems, leaves, and fruits.

8. **FOOD CHAIN:** Since birds and other animals cannot make their own food, they get their food by feeding on plants, or animals that have eaten plants. This flow of food energy is called a **food chain**. Each food chain begins with the food energy produced by plants. When animals feed on plants, much of the food energy is passed onto them. Some of the food energy may then be passed to the animals that eat plant-eating animals. You can make a food chain in the forest ecosystem illustration by following these steps: Using a pencil, first draw a line from the acorns of the white oak (1) to the southern flying squirrel (2). From the southern flying squirrel, draw a line to the eastern screech owl (3). Then draw a line from the eastern screech owl to the barred owl (4). The result is a food chain with four links. The barred owl is the predator at the top of the food chain because few, if any, animals in the forest ecosystem, are strong and quick enough to catch it.

9. **FOOD WEB:** There are many food chains in an ecosystem. All of the food chains linked together form a **food web**. To create a food web in the forest ecosystem illustration, draw these lines. From the seeds of the silver maple (5), draw a line to the black-capped chickadee (6) and to the southern flying squirrel. From the leaf beetle on the silver maple leaf, draw a line to the southern flying squirrel, and then to the chickadee. From the rosy maple moth caterpillar on the trunk of the silver maple, draw a line to the chickadee, to the flying squirrel, and then to the eastern screech owl. From the eastern gray tree frog on the leaf of the white oak, draw a line to the screech owl. From the spider on the silver maple's leaves, draw a line to the screech owl, to the barred owl, and then to the red-shouldered hawk (7). From the screech owl, draw a line to the red-shouldered hawk. From the flying squirrel, draw a line to the red-shouldered hawk. Finally, from the chickadee, draw a line to the barred owl, and the food web will be complete.

Now that you have created a food web, we can use it to examine how the different forest animals in the illustration get the food energy they need to survive. As you can see in the web, some animals are directly linked to plants. These animals get most or all of their food energy by feeding on plants. Circle the numbers of the animals in the illustration that are plant-eaters. The other animals in the food web get quite a bit or all of their food energy by feeding on the plant-eating animals. Circle the numbers of the animals in the web that feed often or always on the plant-eating animals. Which adult animal, like the barred owl, sits at the top of the food web? _____



The ring-billed gull often feeds on the wastes and dead bodies of animals and plants. **Scavengers** like the gull help to keep non-living materials flowing through the **food web.**

Preparing A Flight Guide

YOUR QUEST

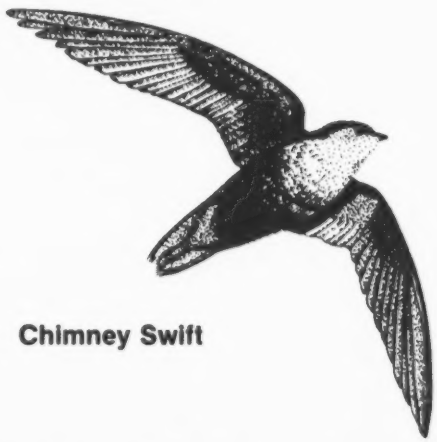
Examine the features birds have developed for efficient flight.

INSTRUCTIONS

Read the information below and complete Work Steps 1-4. Write your answers down on a separate sheet of paper if a blank line is not provided.

Clocking in at speeds of over 100 miles per hour, chimney swifts are among the fastest flying birds in the world. If you have ever seen a chimney swift, it was probably flying high in the sky. This species has the strength and maneuverability to spend most of its time on the wing, chasing down flying insects. Swifts are equally talented as long-distance travellers. Twice a year they migrate between North America and South America, an airborne trek of several thousand miles.

While few birds can match the speed of a swift, almost all are extremely capable flyers. The questions are: How do birds fly with the speed and accuracy it takes to chase insects and other animals? How do they manage to complete their migrations, propelling their small bodies through the air for thousands of miles and for days on end? The answers lie in the features they have developed for efficient flight. Work Steps 1-4 will tell you about these special features.

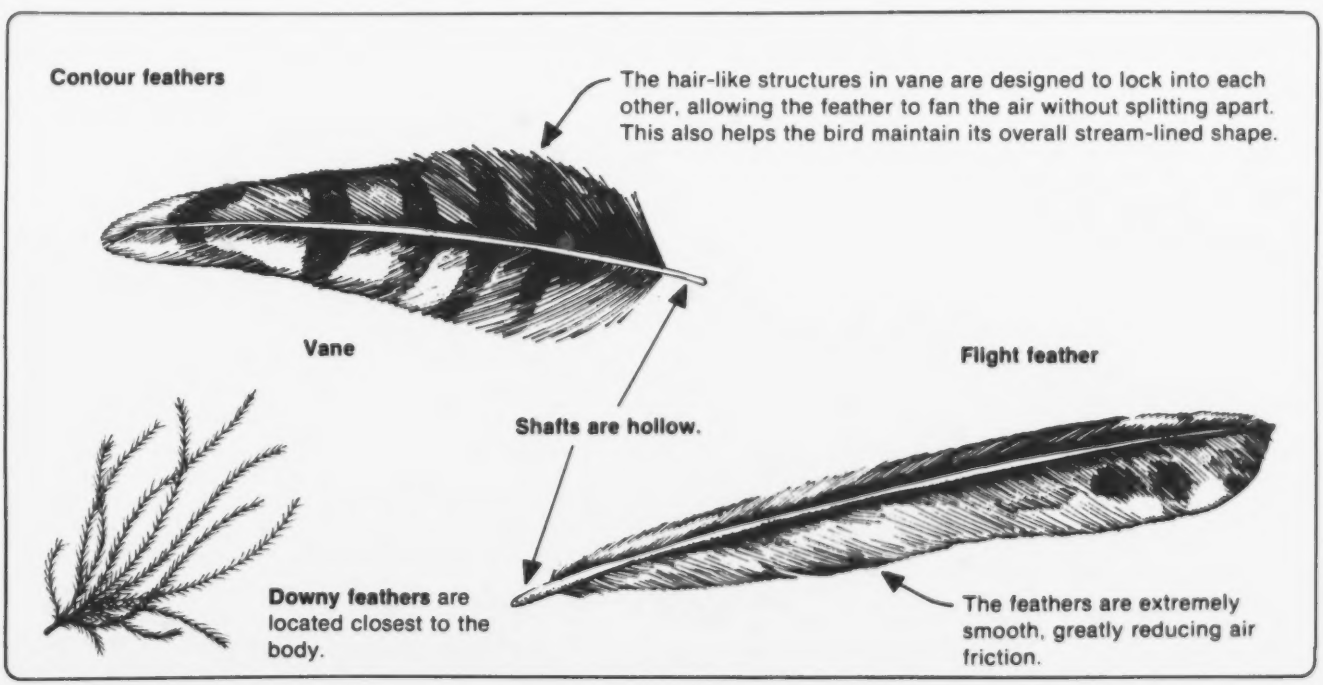


Chimney Swift

WORK STEPS

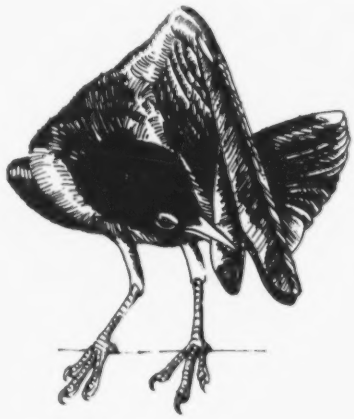
1. Let's begin our investigation by looking at the external body features of birds. If you look closely at the chimney swift, you can see that the bird has a body wonderfully suited for moving and staying aloft in the air. Covered with tightly interlocking and extremely smooth feathers, the swift is much like a sleek missile with wings. When flying, the swift's long, pointed wings form a broad surface just right for fanning the air. Yet its wings are flat enough to slice through the air with the least resistance

(cont. on next page)


Contour feathers
The hair-like structures in vane are designed to lock into each other, allowing the feather to fan the air without splitting apart. This also helps the bird maintain its overall stream-lined shape.
Vane
Flight feather
Shafts are hollow.
Downy feathers are located closest to the body.
The feathers are extremely smooth, greatly reducing air friction.

possible. The swift's small, flexible feet never interfere with its streamlined shape, as they are kept tucked back against its lower body. On a separate sheet of paper, explain how you think the swift maneuvers its wings when it soars, and also when it lands. Try to list, as well, some animals, other than birds, that are capable of flight. Then compare the external body features of those animals with the features birds have developed.

2. As feathers are key to a bird's ability to fly, they merit close study. Amazing is the only word to describe feathers. They are tough enough to fend off driving rain and strong enough to send birds across continents. Yet, in all of nature there are few things lighter, smoother, or more flexible than a feather. Study the feather illustration on page 6 carefully to help you answer the questions in this Work Step and in Work Step 3. As you can see, birds have two major types of feathers — **downy** and **contour**. The soft and woolly downy feathers form a type of blanket around the bird's skin. Do you think the downy feathers are helpful to a bird during times of extremely hot or cold weather? _____ Explain your answer.
3. All of the bird's outer feathers are contour feathers. Along the bird's wings and tail, the contour **flight feathers** are large, flat, and somewhat stiff. Banded together, the flight feathers provide the support and surface a bird needs to fly. The illustration shows that the contour feathers have features advantageous for flight. First, the **shaft** of each feather is hollow. Can you explain why this is an advantage? Secondly, the hair-like structures in the broad surface or **vane** of the feather are designed to lock into each other. Explain why this interlocking action is an advantage. Thirdly, the contour flight feathers are extremely smooth. How does this help a bird fly fast, quietly, and with the least effort possible?
4. To fly fast and long, birds have also developed some specialized internal features. In this work step, we will work with five of those features — the **skeleton, muscles, air sacs, heart,** and **brain**. As you read the next paragraph about how these five specialized features help a bird fly, you will encounter five blank lines. Each blank line should be filled in with one of these five specialized features. Complete the paragraph by correctly filling in the blank lines.



To keep their feathers in tip-top shape, birds preen their feathers with their beaks. This is how they are able to clean, straighten, and oil the feathers. Birds get oil from an oil gland located at the base of the rump.

To stay aloft in the air, a bird must be as lightweight as possible. The bones of a bird's _____ have many air-filled spaces. These hollow cavities help keep the bird's body weight down. During a long flight or tough chase, a bird cannot afford to run out of breath or strength. Because they send an extra supply of fresh air to the lungs, the ballon-like _____ help keep the bird breathing properly. For incredible strength, a bird relies upon its _____ which are large and powerful. The breast muscles, which provide most of the power for flight, take up one third of the bird's total body weight. In order to distribute energy and oxygen, blood must pump rapidly through the body of a hard-working bird. That is the job of its extremely powerful _____ which can beat 1,000 times per minute. All that a bird does requires tricky muscular coordination. As a bird dives, spins, and captures prey in the air, its large and highly specialized _____ is in total charge of the situation.

CLASSROOM DISCOVERY POINTS ____

Creating An Adaptations Guide

YOUR QUEST

Learn more about the specialized beak and foot adaptations birds have developed to gather food.

INSTRUCTIONS

Review the discovery term "Adaptations" on page 3 and then complete Work Steps 1 and 2.

WORK STEPS

1. Look carefully at the six different types of feet illustrated at the bottom of this page. These are the foot adaptations certain birds have developed to maneuver in their habitats while they are gathering food. Label the adaptations according to what function they would be especially useful for. Your choices are **WADING, PREYING** (seizing and carrying live prey), **SWIMMING, PERCHING,** and **CLIMBING**. ***Two of the adaptations are useful for the same manner of traveling.***
2. The beak adaptations shown at the top of the next page are described below. Each beak adaptation is especially useful for gathering certain types of food. Read each description, find the beak drawing that matches the description, and then label the drawing with the name of the beak type on the blank line beneath it. To help you get started, one of the beak adaptation drawings has already been labeled.

BEAK ADAPTATIONS

FISH-EATING BEAK — long, slim, strong, and pointed to reach into the water and to grasp slippery creatures.

INSECT-CATCHING BEAK — small beak that can open wide to grab insects in flight.

SEED-EATING BEAK — arched into the shape of a cone; stout and sharp to crack seeds.

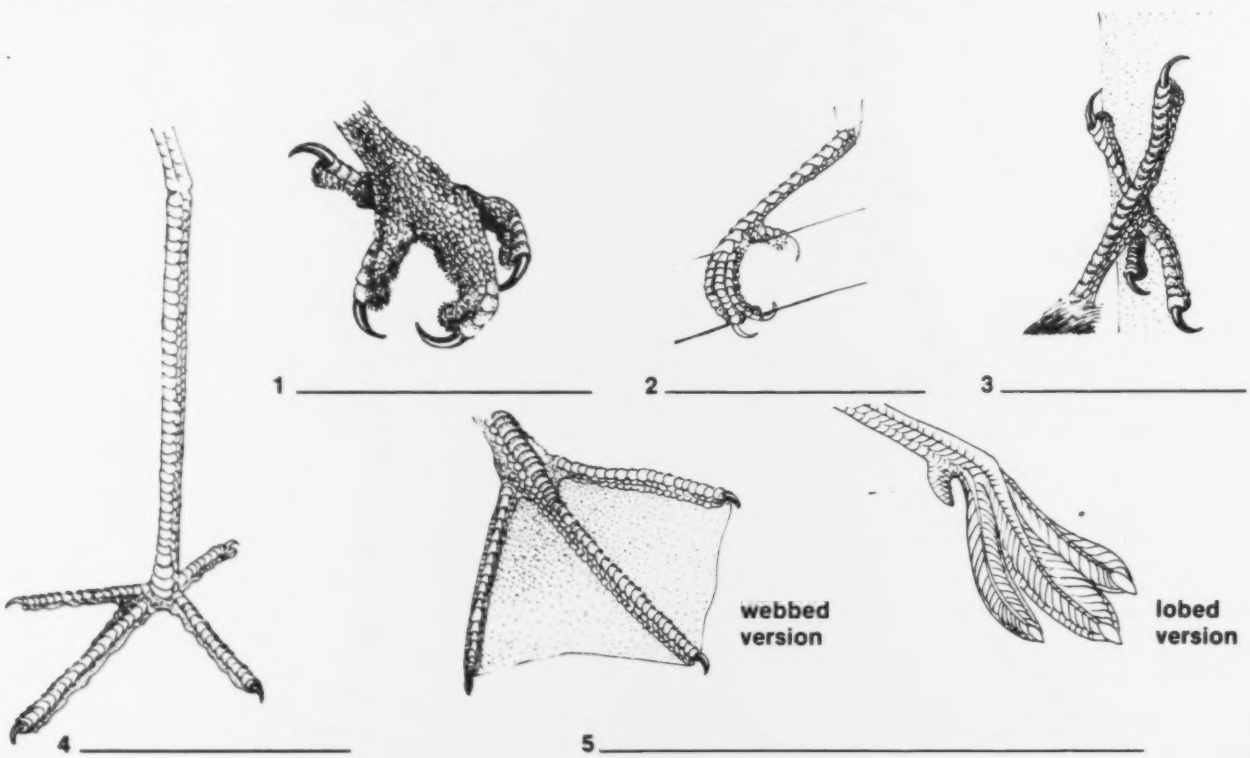
INSECT- AND FRUIT-EATING BEAK — narrow and pointed to grab insects or reach fruits, and slightly arched to crack seeds; larger than an insect-eating beak but shorter than a fish-eating beak; sleaker and longer than a seed-eating beak.

WATER- AND MUD-SIFTING BEAK — wide and shallow; comb-like strainers on edges filter out bits of food in water.

CHISEL BEAK — sturdy and sharply pointed to chisel into wood; accompanied by an extremely long, barb-tipped tongue to pull insects and insect eggs out of tunnels in bark or wood.

PREYING BEAK — stout, sharp, and sharply hooked to tear the flesh of animals.

PROBING BEAK — thin and long to reach insects and other small animals buried in mud or sand.



1 _____ 2 _____ 3 _____

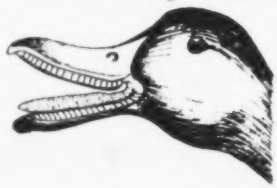
4 _____ 5 _____

1 _____

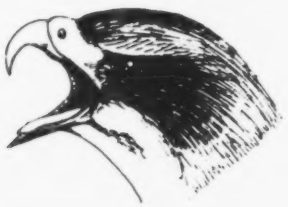
2 insect-and fruit-eating beak

3 _____

4 _____



5 _____



6 _____

7 _____

8 _____

CLASSROOM DISCOVERY POINTS

Building A Nest Guide

YOUR QUEST

Learn about some of the types of nests built and used by birds.

INSTRUCTIONS

Shown on the next page are eleven kinds of bird nests. Your job is to use the nest descriptions below to label the nest drawings.

NEST DESCRIPTIONS

CAVITY NEST: a hollow pocket in a tree.

LARGE STICK NEST: a mass of sticks and leaves in the crotch of a tree.

SMALL STICK NEST: a small, loose collection of sticks resting on a fork of branches.

SHRUB CUP NEST: a rounded nest of grasses, bark strips, leaves, and stems woven around the branches of a shrub or small tree.

GRASSY CUP NEST: a rounded nest of grass stems woven into a stand of grasses.

BANK NEST: a tunnel in a bank, the actual nest is an enlarged chamber at the end of the tunnel.

LEAFY GROUND NEST: a bed of leaves on the ground in a wooded area.

GRASS GROUND NEST: a bed of grasses on the ground in a grassy area.

BARE GROUND NEST: a shallow, scratched-out hollow in the bare ground, often on a sandy or rocky surface.

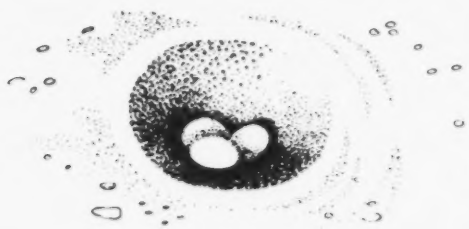
HANGING NEST: a hanging basket of plant fibers, moss, leaves, twigs, and feathers.

FLOATING NEST: a mass of reeds floating on the surface of water.

Nest Guide

1 _____

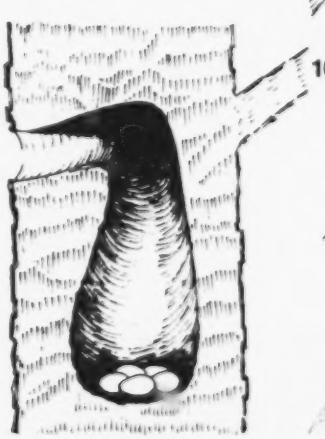
2 _____



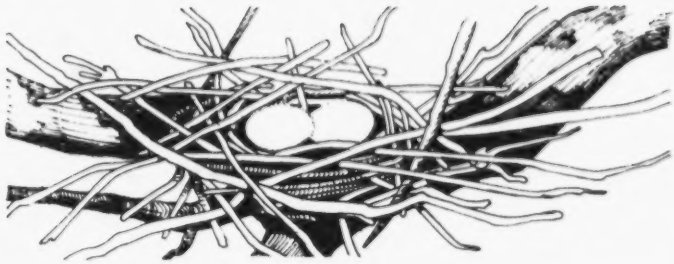
3 _____

4 _____

5 _____



6 _____

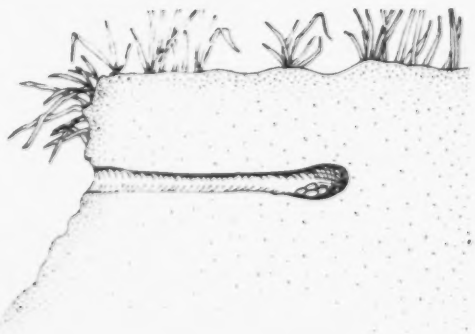


7 _____

8 _____

9 _____

10 _____



11 _____

Observing Birds in the Wild

YOUR QUEST

Locate birds outdoors so that you can study their features and behavior.

INSTRUCTIONS

In the exercise presented on the next page, you will be looking for birds exhibiting different types of behavior, like flying, swimming, or singing. When you spy a Discovery Item, put a check in the box to the left. If you can accurately identify a species,

write its name on the blank line and double your Discovery points for that bird only. ***You can only score once with each item.*** Before you get started in your quest, take a few minutes to review the Observation Tips below. Please also review the Observation Tips before you take on the Outdoor Discoveries in Chapters 2 and 3.

BIRD OBSERVATION TIPS

1. Before you begin your fieldwork, dress in comfortable clothing that is dully colored. This will help you to blend into the natural habitats you will be exploring. Also, sneakers are good footgear as they will enable you to move about quietly.
2. Gather up the Equipment you will need — your Discovery Manual, a Field Guide, a pair of binoculars, if possible, a notebook, and a pencil.
3. Conduct your field work in a natural habitat. If you live in a town or city, you can explore parks, vacant lots, roadsides, and even backyards. If you live in a rural area, you can range out over the countryside. You should, however, get permission to walk on any land you wish to investigate from the owners. To see the most variety of birds, try to visit a local wildlife sanctuary, state park or federal wildlife refuge.
4. Try to search for birds within an hour or two of dawn or a couple of hours before dusk. These are the times when birds are most active.
5. When you spot a bird in the wild, take a quick mental picture of it. Try as well to quickly tune into its song or call. Then, if the bird flies away after just a few moments you will at least be able to record its basic coloration, size, shape and voice. You can also describe what the bird was doing when you saw it. Was the bird singing, travelling, gathering food, or tending to its nest and young? If you got a good look at the bird, carefully note its Key Field Marks. The Key Field Marks are the special markings and features of the bird that you should record so that you can identify the bird if you see it again. You will be learning more about the kinds of Key Field Marks many birds have when you build your Field Guides in Chapter 2.
6. Don't forget to record the type of natural habitat where you see a bird. Look at the surroundings carefully. Then, describe as best you can the physical environment, including the types of plants present, the time of the year, and the weather. This information will help you to better understand the natural conditions each species needs to survive.
7. Always remember — the natural environment comes first. ***Never harm or disturb an animal, plant, or nest. Also, never take an animal away from its habitat. No bird, or other creature, can exist for very long apart from its own environment.***

Sings in the night woods, a repeated "whip' poor-weel'."

Do you know this species?

_____

OBSERVING BIRDS IN THE WILD

Your Points	Base Discovery Point Value			Discovery Items to Locate and Observe
_____	10	_____	☐	a bird singing or calling. (Most singing birds are males. Singing is how males announce their nesting territories during the spring and summer. By singing, a male bird is saying to other male birds, "This is my space." To females, it is an invitation to come in and see what a great place this is to raise a family).
_____	20	_____	☐	a bird preening. (Sometimes a preening bird looks as if it is nibbling or tugging at its feathers. Other times it looks as if the bird is combing its feathers with its beak).
_____	30	_____	☐	a bird bathing in water.
_____	30	_____	☐	a bird taking a dust bath to choke parasites.
_____	15	_____	☐	a bird soaring. (While soaring, a bird's wings are spread and held still, beating only occasionally. A soaring bird stays aloft by riding air currents).
_____	10	_____	☐	a bird flying. (The wings are beating).
_____	10	_____	☐	a bird perched on a limb or branch.
_____	30	_____	☐	a bird hovering in mid-air (The wings are beating rapidly).
_____	20	_____	☐	a bird swimming.
_____	10	_____	☐	a bird walking or hopping on the ground.
_____	20	_____	☐	a bird diving or tipping up its rump in the water.
_____	15	_____	☐	a bird standing on the ground.
_____	15	_____	☐	a bird wading in water.
_____	20	_____	☐	a bird feeding.
_____	25	_____	☐	a bird flying with a worm or insect in its mouth. (may be taking food to its young).
_____	25	_____	☐	a bird feeding its young.
_____	20	_____	☐	a bird flying with or gathering nesting material (twigs, leaves, grasses).
_____	20	_____	☐	a bird perched on the edge of its nest.
_____	10	_____	☐	a bird climbing a trunk or branch.
_____	20	_____	☐	a bird hanging upside down from a branch to feed.
_____	20	_____	☐	a bird chiseling into the side of a tree or branch.
_____	20	_____	☐	a bird keeping watch over an open area by perching on a wire, fence post, tree snag, or other place.
_____	30	_____	☐	a bunch of small birds chasing a large bird (hawk, crow, or owl), called "mobbing."
_____	25	_____	☐	a group of birds flocking together.
_____	20	_____	☐	other behaviors. (list on separate sheet and score 30 points for each behavior).
_____	**Total Points**			

20

Chapter 2: Building Your Bird Field Guides

Dear Student,

Your task in this chapter is to build several **Bird Field Guides**. As you put together these Field Guides, you will be taking a firsthand look at how some birds are adapted to travel, nest, and gather food. You should keep your Discovery Manual, especially the Adaptations Guide, close at hand while you work. The Nest Guide will also be helpful since you will be investigating how and where birds nest in their habitats.

You also will be learning how to use written descriptions to identify and label bird drawings. These labeled drawings will be your finished Field Guides. We suggest that you use the three species shown on this page as **"yardstick"** birds as you build and use your Field Guides. For example, if you read a description that lists a bird as small, you can know that the bird is about the same size as a house sparrow. If a species is described as medium-sized, it is roughly the same size as an American robin. A large species is as large or larger than a rock dove (domestic pigeon).

Once your Field Guides are complete, you can use them to explore natural habitats just about anywhere in our area. For instance, you may want to take them along when you visit a wildlife sanctuary or park. You can also use them to recognize birds in natural habitats near your home. Your Field Guides will be especially helpful if you use them in conjunction with the larger Field Guides that you can either borrow from the library or buy.

For each of the indoor exercises that you complete, award yourself 100 Classroom Discovery Points. To earn Outdoor Discovery Points, you can tackle the outdoor assignment at the end of this chapter. Score your points for each exercise in the Discovery Emblem at the beginning of each exercise. Enter your final chapter scores in the tally box below.

Chapter 2 Tally Box

TOTAL CLASSROOM DISCOVERY POINTS _____

TOTAL OUTDOOR DISCOVERY POINTS _____

GRAND TOTAL _____

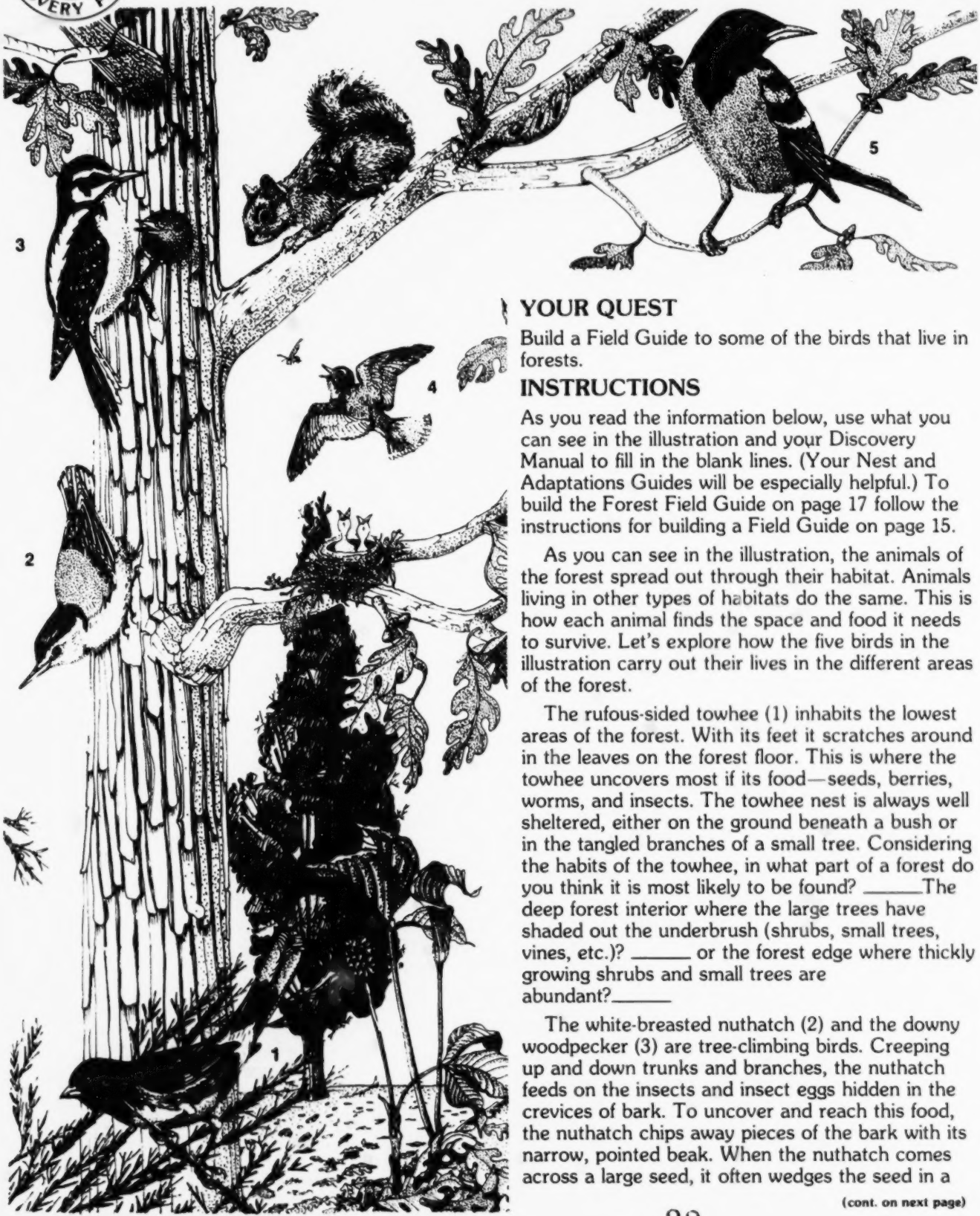
House Sparrow 6"

American Robin 9-11"

Rock Dove 13"

CLASSROOM DISCOVERY POINTS ____

A Field Guide To Forest Birds



YOUR QUEST

Build a Field Guide to some of the birds that live in forests.

INSTRUCTIONS

As you read the information below, use what you can see in the illustration and your Discovery Manual to fill in the blank lines. (Your Nest and Adaptations Guides will be especially helpful.) To build the Forest Field Guide on page 17 follow the instructions for building a Field Guide on page 15.

As you can see in the illustration, the animals of the forest spread out through their habitat. Animals living in other types of habitats do the same. This is how each animal finds the space and food it needs to survive. Let's explore how the five birds in the illustration carry out their lives in the different areas of the forest.

The rufous-sided towhee (1) inhabits the lowest areas of the forest. With its feet it scratches around in the leaves on the forest floor. This is where the towhee uncovers most if its food—seeds, berries, worms, and insects. The towhee nest is always well sheltered, either on the ground beneath a bush or in the tangled branches of a small tree. Considering the habits of the towhee, in what part of a forest do you think it is most likely to be found? _____The deep forest interior where the large trees have shaded out the underbrush (shrubs, small trees, vines, etc.)? _____ or the forest edge where thickly growing shrubs and small trees are abundant?_____

The white-breasted nuthatch (2) and the downy woodpecker (3) are tree-climbing birds. Creeping up and down trunks and branches, the nuthatch feeds on the insects and insect eggs hidden in the crevices of bark. To uncover and reach this food, the nuthatch chips away pieces of the bark with its narrow, pointed beak. When the nuthatch comes across a large seed, it often wedges the seed in a

(cont. on next page)

crevice. Then, using its beak like a hatchet, the nuthatch cracks the seed open. From "hatching" away at nuts, seeds, and berries, this little bird got its name.

To gather its food, the downy woodpecker locks its claws into the side of a tree or branch. Then with its stiff and pointed tail feathers acting as a back brace, the woodpecker proceeds to hammer its beak long and hard into the bark and wood. To withstand this pounding action, the woodpecker has developed extra strong neck muscles and a heavy-duty, thickened skull. Once the woodpecker has cut into the wood with its sharply pointed beak, it is able to get at the larvae of boring beetles. These larvae are located in deep tunnels and, to pull them out, the woodpecker uses its extraordinarily long and barb-tipped tongue. What type of beak adaptation does the downy woodpecker have?

_____

The handy beak of the downy woodpecker is also a good tool for cutting out deep holes in trees for nesting. What is this type of nest called? _____ If the woodpecker dies or abandons its nesting hole, other cavity-nesting birds or mammals may move into it. The white-breasted nuthatch, southern flying squirrel, screech owl and black-capped chickadee are just a few of the animals that often raise their young in old woodpecker holes. That is one reason why woodpeckers and the dead trees in which they often cut their nesting holes are so important to a forest habitat.

The eastern wood-pewee (4) and the northern oriole (5) move in and out of the mid- to high-level branches. Both of these birds have three narrow toes in front of the foot and one toe behind, an ideal arrangement for grasping and standing on twigs and limbs. What is this type of foot adaptation called? _____

As you can see in the illustration, the eastern wood-pewee can catch insects in mid-air. What type of beak adaptation does the pewee have? _____ The northern oriole doesn't patrol the air space as regularly as the pewee. Instead, the oriole tends to stay in the highest branches, known as the forest canopy. In the canopy, the oriole picks insects and berries off of the twigs and leaves. The oriole also builds an uncommon type of nest in the forest canopy. Of all the nests in your Discovery Manual, the oriole's nest is the only type that hangs like a stocking from tree limbs. What is this type of nest called?

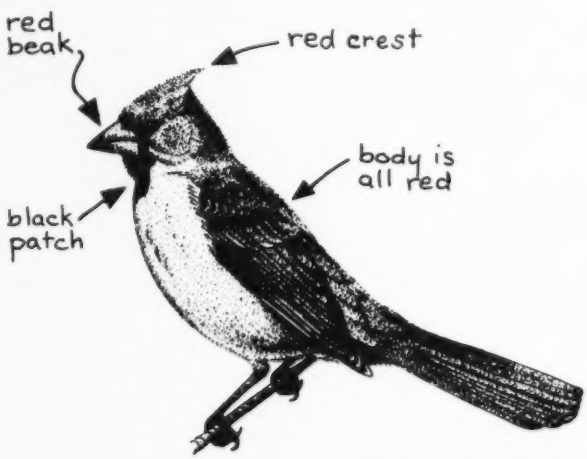
_____

INSTRUCTIONS FOR BUILDING A FIELD GUIDE

The descriptions of six additional forest species are listed at the bottom of page 16. Each of the birds is shown in the Forest Bird Field Guide on the following page. Your job is to match the birds shown in the Field Guide with their descriptions. To do that, work with one description at a time. The first part will tell you about the overall coloration of the bird. The second part lists the KEY FIELD MARKS of the bird. The KEY FIELD MARKS are the features of the bird that separate it from almost every other species. The last two parts of the description tell you the length (L) and/or wingspan (W) of the bird and how its voice (song or call) sounds.

After you have read a description carefully, find a bird in the Field Guide with one or more of the same KEY FIELD MARKS (as indicated by arrows). Once you have made the match, write the bird's name next to its number at the top of the Field Guide. Then, use the description to label any of the KEY FIELD MARKS on the bird that are not already labeled. For example, if the description of a bird lists four KEY FIELD MARKS, there will be four arrows pointing out those KEY FIELD MARKS on the drawing of the bird. If two of the arrows are not labeled, you can find what they refer to in the description, and then you will be able to label the arrows yourself. Once you have identified and labeled all six birds, your Field Guide will be complete.

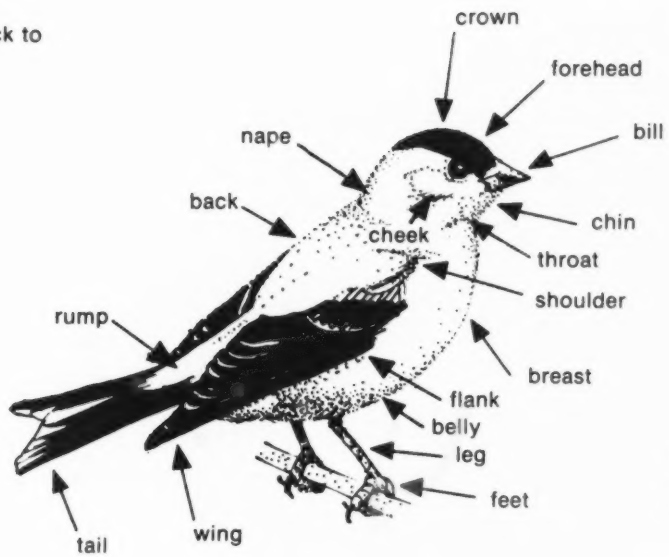
Before you get started on your Field Guide, study carefully the Body Parts and Special Markings Diagram at the top of page 16.



By looking at the KEY FIELD MARKS of this species, can you identify it? _____

The Body Parts of Birds

The parts from the bill back to the tail are called the **upperparts**.

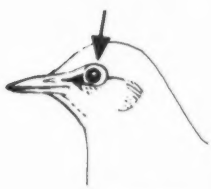


The parts from the bill down to the underside of the tail are called the **underparts**.

Special Markings

eyebrow

eye stripe



eye ring

mustache

BIRD DESCRIPTIONS FOR FOREST FIELD GUIDE

(The adult male breeding bird is described. Females, non-breeding males, and young birds may look different.)

Broad-Winged Hawk: This large, stocky bird has dark brown upperparts. The whitish underparts are heavily barred with reddish brown or rufous (a rusty color). KEY FIELD MARKS: 1. dark brown upperparts; 2. rufous barring on the underparts; 3. two white bands across the tail; L: 14-19" VOICE: a high-pitched and long "peheeeeeee."

Great Horned Owl: This very large owl has dark gray-brown upperparts that are mottled with whitish gray. The underparts are buff with dark brown bars. KEY FIELD MARKS: 1. large ear tufts; 2. a white throat; 3. the dark brown bars on the underparts; L: 18-25" W: 55" VOICE: WHOO-WHOOO-WHOOOOOOOO.

Pileated Woodpecker: This large woodpecker is mostly jet black. KEY FIELD MARKS: 1. a long, red crest; 2. a red mustache; 3. a curving band of white from the bill to the nape (back of neck) and down to the breast; 4. large patches of white on the underwings (seen in flight); L: 16 1/2-19" VOICE: a loud, repeating "wuk-wuk-wuk."

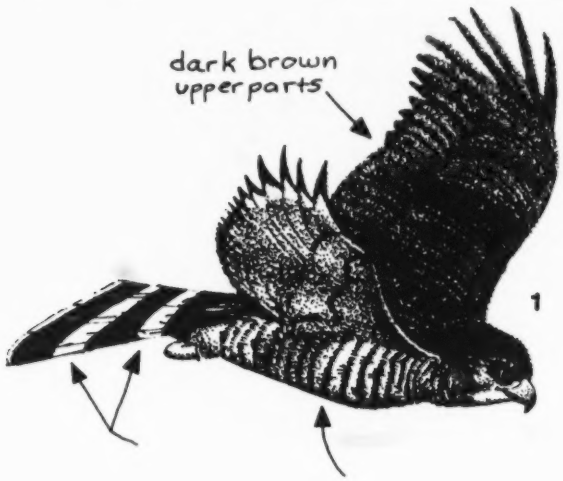
Rose-Breasted Grosbeak: This medium-sized bird has mostly black upperparts and white underparts. On the breast, there is a triangular bib of rose-red. KEY FIELD MARKS: 1. a pale, arched bill; 2. a rose-red breast; 3. white wing bars; 4. a white rump; 5. white spots on the tail; L: 7-8 1/2" VOICE: calls a metallic "clink."

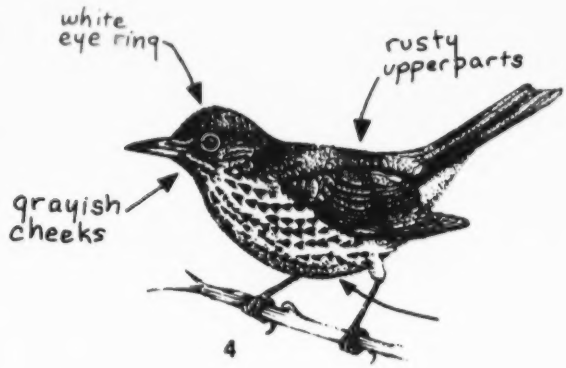
Wood Thrush: This robin-sized bird has rusty brown upperparts and white underparts that are heavily spotted with black. KEY FIELD MARKS: 1. a white eye ring; 2. grayish cheeks; 3. large black spots on the underparts; 4. rusty upperparts; L: 8" VOICE: sings a series of rich, flutelike phrases, calls in alarm a sharp "pit, pit, pit, pit."

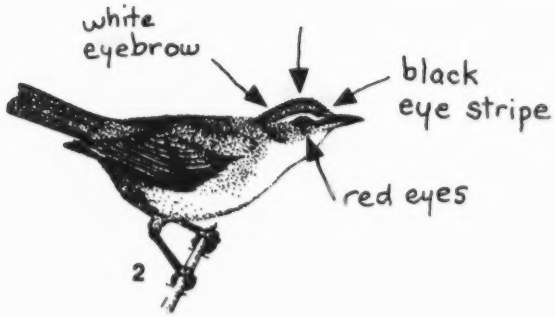
Red-Eyed Vireo: This small bird has mostly green upperparts and white underparts. There is a wash of yellowish olive on the sides and flanks. KEY FIELD MARKS: 1. red eyes; 2. a blue-gray crown; 3. a white eyebrow; 4. a black eye strip; L: 5 1/2-6 1/2" VOICE: calls a harsh mewing note, sings an almost endless series of short, musical phrases.

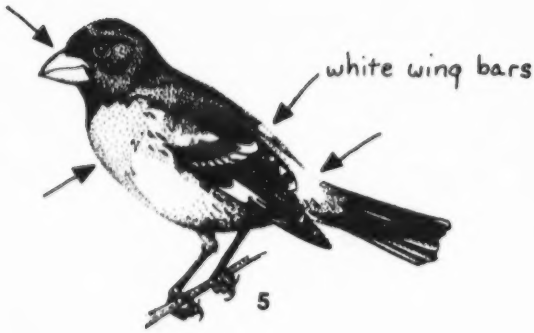
FOREST BIRD FIELD GUIDE

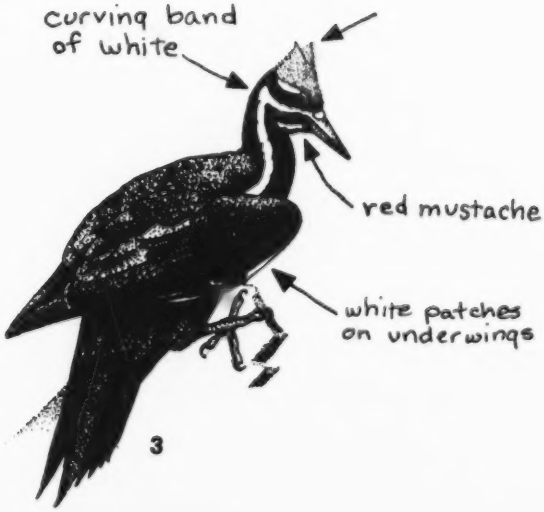
1. _____ 3. _____ 5. _____
2. _____ 4. _____ 6. _____

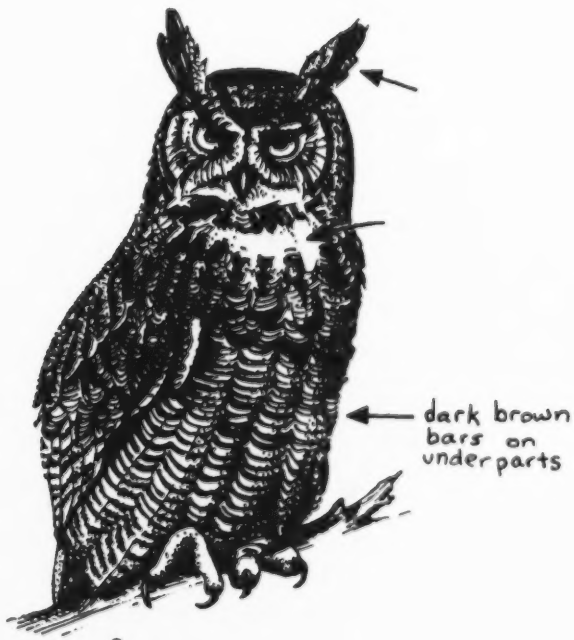












25[6]

CLASSROOM DISCOVERY POINTS

A Field Guide to Open-Country Birds

YOUR QUEST

Build a Field Guide to some of the birds that inhabit pastures, fields, meadows, roadsides and fencerows.

INSTRUCTIONS

Follow the instructions you used to build a Field Guide to Forest Birds. Be sure to use your Adaptations and Nest Guides.

To begin this Field Guide, let's look first at the eastern meadowlark (1) and vesper sparrow (2). Both of these species commonly inhabit fields, pastures, meadows, and grassy roadsides. Like many grassland birds, they build a nest of grasses

(cont. on next page)

on the ground. What is this type of nest called? _____ Is there one shown in the illustration? _____

For ground-nesting birds, life in an open, grassy habitat offers some advantages as well as disadvantages. Look carefully at the illustration and then decide which of the following are the advantages (A) and which are the disadvantages (D). ___ the thick stands of flowering plants and grasses. ___ the fact that many grasslands are mowed during the nesting season. ___ the streaked pattern created by the grasses compared to the streaked markings that many grasslands birds have. ___ the absence of large trees to block the ground from the sight of birds of prey.

Now let's zero in on the food gathering habits of open grassland birds like the vesper sparrow and eastern meadowlark. From what you can see in the illustration, does the eastern meadowlark have a seed-cracking beak, an insect-and fruit-gathering beak, or an insect-catching beak? _____ If you said an insect-and fruit-gathering beak, you are correct. Like the vesper sparrow, the eastern meadowlark feeds mostly on seeds and berries when they are ripe and ready to eat. When insects are abundant, however, these birds feed less on seeds and berries and more on insects. Do insects appear to be abundant in the grassland illustration? ___ Judging from the condition of the wildflowers in the illustration, what two seasons could be in progress? _____ or _____. Can you now say when grassland birds like the sparrow and meadowlark feed the most heavily on insects? _____ During which seasons do the birds either migrate to a warmer climate or switch over to a diet of ripened seeds? _____

Many open-country birds live only in areas that are brushy or woody. The American goldfinch (3) and the indigo bunting (4), for example, frequent old fields growing up in brush and shrubby roadsides and fencerows. Both of these species also frequent the bushy outer edges of woodlands. In brushy areas, the goldfinch and bunting are able to use shrubs and small trees for nesting. With fine strips of plant material, both species build a small, bowl-shaped nest. What is this type of nest called? _____ From what you can see of the bunting and goldfinch in the illustration, do they also have the same kind of beak adaptation? ___ If you answered yes, you are correct. What type of food are these two birds especially equipped to gather and handle? _____

The American kestrel (5) is an interesting bird because it uses an open grassland to meet some of its needs. In the nearby edge of a forest, it finds a habitat suitable for other needs. For example, when the kestrel hunts for insects, small birds, or mammals, it usually keeps watch over an open, grassy area from a tree snag or utility wire. Sometimes it cruises fairly high in the sky, pausing here and there to hover if it sees animals moving on or close to the ground below. In which habitat, a grassland or forest edge, do you think the kestrel hunts? _____ During the breeding season, the kestrel uses a cavity nest to rear its young. In which habitat, a grassland or a forest edge, do you think the kestrel finds this type of nest? _____

BIRD DESCRIPTIONS FOR OPEN-COUNTRY FIELD GUIDE

(The adult male breeding bird is described. Females, non-breeding males and young birds may look different.)

Short-Eared Owl: This fairly large bird is light brown streaked with dark brown. The small ear tufts are hard to see. KEY FIELD MARKS: 1. the light brown streaked with dark brown overall coloration; 2. a short, thick neck; 3. dark facial disks (a circular area of feathers around eyes); 4. long wings; L: 16" VOICE: soft "toot-toot-toots," barks, squeaks and hisses.

Red-Tailed Hawk: This large hawk has dark brown upperparts except for the tail which is brick red. The cream colored underparts are barred and streaked with brown around the belly. KEY FIELD MARKS: 1. a dark brown head and upperparts; 2. a red tail; 3. brown streaks on the belly; L: 19-25" VOICE: nest defense call is a raspy "tseer."

Savannah Sparrow: Above and below this small, tan sparrow is streaked with dark brown. KEY FIELD MARKS: 1. a yellow eyebrow; 2. a short, notched tail; 3. streaked upperparts; 4. streaked underparts; L: 5-6 1/2" VOICE: calls a high "tsit".

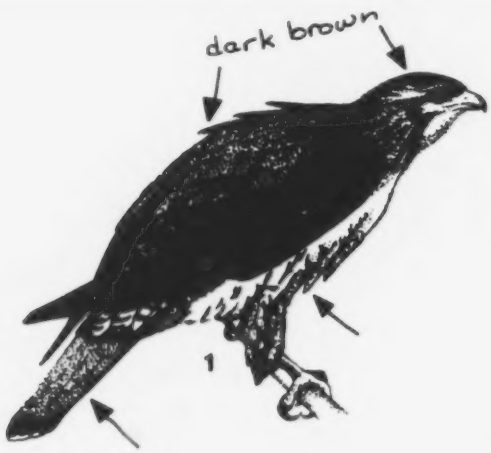
Brown-Headed Cowbird: This medium-sized bird has a glossy black body and a coffee-brown head. KEY FIELD MARKS: 1. a glossy black body; 2. a brown head; 3. a dark, stout beak; L: 6-8" VOICE: flight call is a whistling "weee-titi."

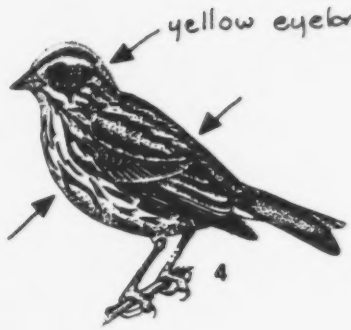
Bobolink: This medium-sized bird has a black head, underparts, and tail. The wings are also black but some of the feathers near the shoulder are white. KEY FIELD MARKS: 1. a whitish rump and lower back; 2. a golden nape; 3. a sharply pointed and stiff tail; L: 6-8" VOICE: flight song is a bubbling "Bobolink-bobolink-bobolink-bobolink-bobolink-bobolink."

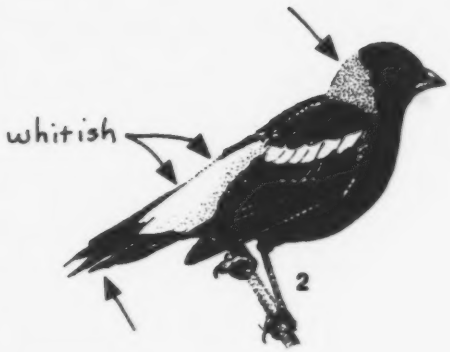
Killdeer: This long legged, medium-sized bird is brown above and white below. KEY FIELD MARKS: 1. two black bands across the chest; 2. a black band across the forehead; 3. a red eye ring; 4. a rufous rump; L: 9-11" VOICE: a ringing "kill-dee" and repeated cries of "dee-dee-dee."

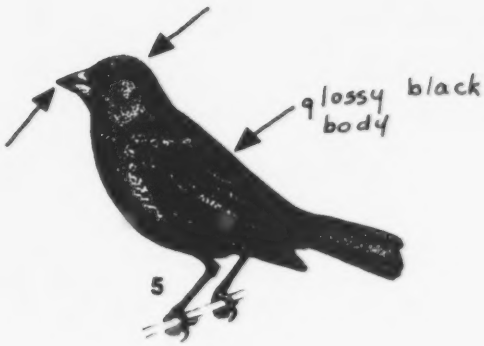
OPEN-COUNTRY BIRD FIELD GUIDE

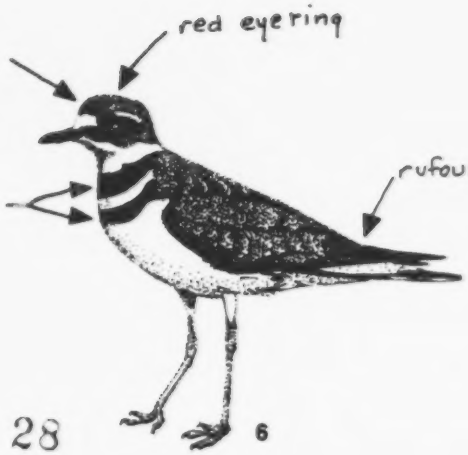
1. _____ 3. _____ 5. _____
2. _____ 4. _____ 6. _____











28

A Field Guide To Freshwater Wetland Birds

YOUR QUEST

Build a Field Guide that you can use to recognize some of the birds that live in and around freshwater streams, lakes, ponds, marshes and swamps.

INSTRUCTIONS

Follow the instructions you used to build a Field Guide to Forest Birds. Be sure to use your Adaptations and Nest Guides as you work with the illustration below and the information on the next page.

When you investigate a freshwater wetland, you will find that the different bird species feed in the areas they are adapted to. The mallard (1), for example, spends most of its time gathering seeds along the surface of the open water. If the water is shallow, the mallard often "tips-up" to nibble on the leaves and stems of submerged (underwater) vegetation. When the mallard surfaces again, the special comb-like structures on the edge of its beak trap the plant material while allowing the water to drain out. Many waterfowl species have this type of beak adaptation. What is it called? _____ What type of foot adaptation for traveling in water does the mallard have? _____

The American coot (2) also feeds in the open water but it sometimes works the shore. The coot in the illustration is showing how this bird can quietly sink into the water to hide from predators. To stay submerged, the coot is grasping the thin stems of common cattail. Check your Adaptations Guide and decide if you think the coot has lobed or webbed feet? _____

The secretive sora (3) moves about in the dense, marshy vegetation in and around the shore. Although the sora can swim and dive, it most often searches for insects and snails by wading in the shallow water or by climbing across floating vegetation. The sora's toes are so long, and its body is so light, it can easily balance itself on a delicate lily pad. What type of leg and foot adaptation does the sora have? _____ The sora, like most marsh birds, also has a body well suited for moving through dense grasses and reeds. From what you can see of the sora in the illustration, do you think that marsh birds tend to have wide bodies and short legs or narrow bodies and long legs?

_____

The belted kingfisher (4) usually perches on a tree snag or power line overlooking an area of open water. When the kingfisher spots a fish or frog moving in the water, it makes a sharp dive and actually plunges its full body into the water. Once the catch is made, the kingfisher flies out of the water and returns to its perch to eat. What beak adaptation does the kingfisher have for catching water animals? _____

There are some wetland birds that don't have any special adaptations for moving or feeding in water. There are two species in the illustration that fit into this category. What are their numbers? _____ If you answered numbers 5 and 6, you are correct. Both the swamp sparrow (5) and the red-winged blackbird (6) lack equipment for life in the water. However, these birds do live in the vegetation in and around wetlands. From what you can see in the illustration, which of these two species commonly feeds and sings above the water surface in the tall grasses and reeds? _____ Which of the two species commonly feeds in and around the fallen branches, leaves and stems close to the water's edge?

_____

During the breeding season, most wetland birds nest close to the areas they feed in. Many use the soft-stemmed water plants to build, anchor and shelter their nests. For example, the sora builds a basket-like nest of dead cattail blades, bulrushes, and grasses. The nest is usually located just above the water level in a thick stand of cattails. Belted kingfishers, however, make a very different type of nest. Using their beaks and feet, a pair of kingfishers dig a tunnel in a nearby bank. At the end of the tunnel, the kingfishers excavate an enlarged, circular chamber for their eggs. What is this type of nest called? _____

BIRD DESCRIPTIONS FOR FRESHWATER WETLAND FIELD GUIDE

(The adult male breeding bird is described. Females, non-breeding males and young birds may look different. An asterisk (*) means that the species also commonly inhabits saltwater wetlands.)

Spotted Sandpiper: This small, rather short-legged sandpiper is gray-brown above and white below. KEY FIELD MARKS: 1. a black eye stripe; 2. a white eyebrow; 3. dark brown spots on the underparts; L: 7-8" VOICE: a loud "weet" or "peet-weet." *

Bald Eagle: The adult bald eagle is a very large bird. It has a dark brown body and a white tail and head. KEY FIELD MARKS: 1. a yellow bill; 2. a white head; 3. a white tail; L: 30-43" W: 80" VOICE: harsh, squeaking chitters and screams. *

Marsh Wren: This small wren has rusty brown upperparts and mostly white underparts. KEY FIELD MARKS: 1. fine streaks of white on the upper back; 2. a white eyebrow; L: 4" VOICE: sings a gurgling song ending with a quick rattle "cut-cut-turrrrrrrrr-ur," calls "tsuk-tsuk."

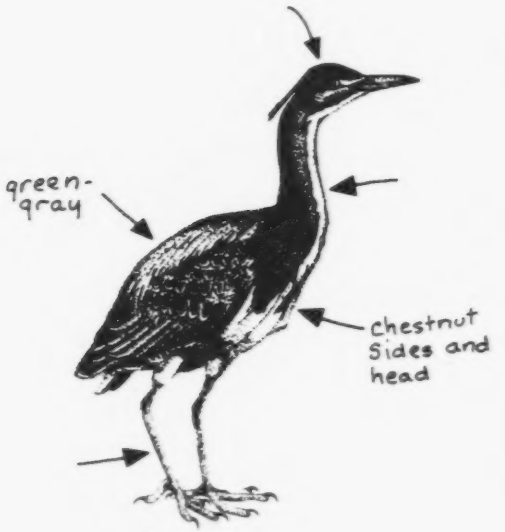
Green-Backed Heron: This crow-sized bird is mostly dark green-gray except for its head, neck and sides which are a rich chestnut (reddish blond-brown). KEY FIELD MARKS: 1. a black crown; 2. a chestnut head and sides; 3. a white streak down its throat and belly; 4. bright yellow legs; 5. green-gray upperparts; L: 15-22" VOICE: a loud repeating "skouwp." *

Yellow Warbler: This warbler is yellow-green above and bright yellow below. KEY FIELD MARKS: 1. fine streaks of chestnut on the breast; 2. a yellow eye ring; 3. yellow wing bars; 4. yellow spots on the underside of the tail, seen in flight; L: 4" VOICE: sings a cheerful, lively "tseet tseet-tseet sitta-sitta-see."*

Pied-Billed Grebe: This short-bodied grebe is mostly dull brown. KEY FIELD MARKS: 1. a black ring around the short, whitish bill; 2. fluffy white feathers under the tail; 3. a black throat patch; L: 12-15" VOICE: calls "kuk-kuk-cow-cow-cow-cow-cowp-cowp."

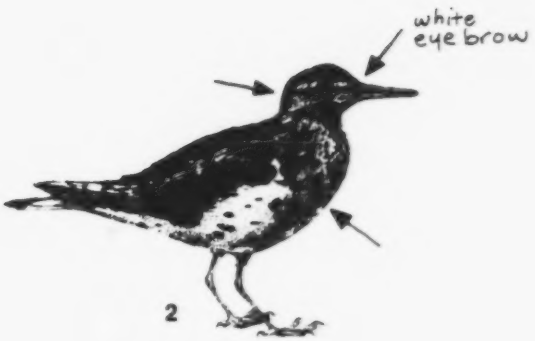
FRESHWATER WETLAND BIRD FIELD GUIDE

1. _____ 3. _____ 5. _____
2. _____ 4. _____ 6. _____



1

4



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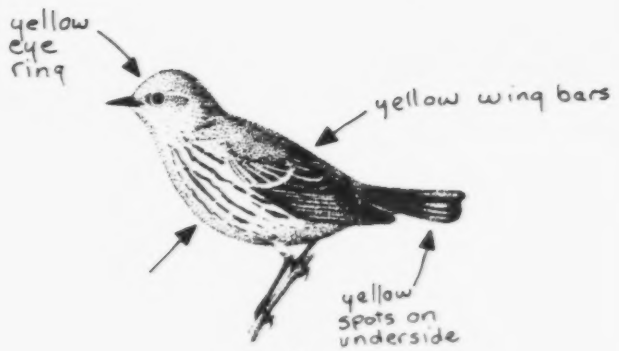

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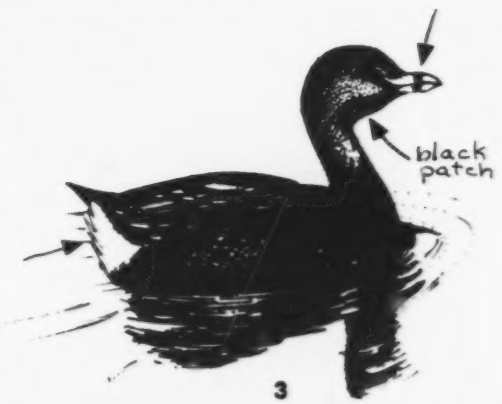

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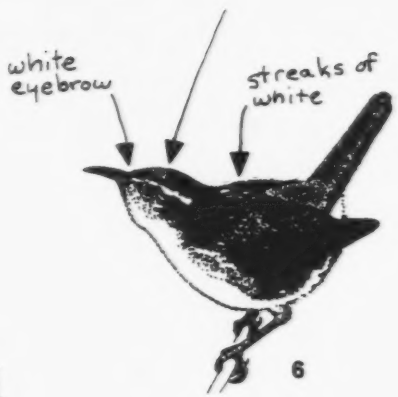


6

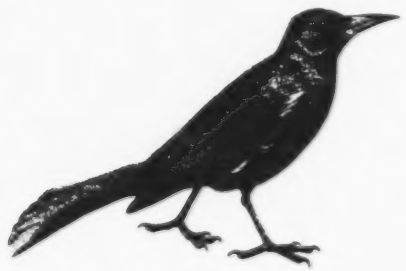
Adding Onto Your Field Guides

YOUR QUEST

Prepare field guide entries for plant and animal species.

INSTRUCTIONS

1. Shown on the next two pages is an Animal Field Guide Entry Form and a Plant Field Guide Entry Form. You can use these forms to prepare field guide entries for animal and plant species that you observe outdoors. The entries you prepare for bird species can be added to your Bird Field Guides. You can use the entries you prepare for other types of animals and plants to build new Field Guides. After you have prepared a field guide entry, it's a good idea to compare the information you have recorded with the information concerning the same species in a commercial field guide. This will give you an opportunity to see how closely your observations agree with those of more experienced field observers. For every field guide entry that you prepare, award yourself 100 Discovery Points. (If you are using a field guide entry to score points in another outdoor investigation in this workbook, you can only score once per entry.)
2. On the right side of this page is a checklist of the bird species included in Nature Discovery I. We'd like for you to work with this list in two ways. First, if you can spot these birds in the wild, you can score the Discovery Points indicated. Second, we'd like for you to use this list to build a more complete **Checklist of Illinois Birds**. To do that, simply add as many Illinois birds to the checklist as you can. (There are many common, and not so common, Illinois species not already included.) For each additional species that you add to the checklist, award yourself 30 Discovery Points.



Common Grackle

Checklist of Illinois Birds

Species	Discovery Points
Pied-billed Grebe	50
Green-backed Heron	50
Canada Goose	20
Mallard	20
Red-breasted Merganser	50
Osprey	75
Bald Eagle	75
Broad-winged Hawk	50
Red-tailed Hawk	40
American Kestrel	40
Greater Prairie Chicken	500
Northern Bobwhite	40
Sora	50
American Coot	40
Killdeer	40
Spotted Sandpiper	50
Ring-billed Gull	50
Common Tern	75
Rock Dove	10
Eastern Screech-Owl	75
Barred Owl	75
Great Horned Owl	75
Short-eared Owl	100
Whip-poor-will	40
Chimney Swift	20
Ruby-throated Hummingbird	75
Belted Kingfisher	40
Downy Woodpecker	40
Hairy Woodpecker	40
Northern Flicker	20
Yellow-bellied Sapsucker	50
Pileated Woodpecker	75
Eastern Wood-Pewee	40
Tree Swallow	20
Barn Swallow	20
Blue Jay	10
Black-capped Chickadee	20
White-breasted Nuthatch	40
Marsh Wren	50
Eastern Bluebird	50
Wood Thrush	50
American Robin	10
Brown Thrasher	20
Red-eyed Vireo	50
Yellow Warbler	40
Northern Cardinal	10
Rose-breasted Grosbeak	40
Indigo Bunting	20
Rufous-sided Towhee	50
Swamp Sparrow	50
Bobolink	50
Red-winged Blackbird	20
Eastern Meadowlark	20
Common Grackle	20
Brown-headed Cowbird	20
Northern Oriole	40
American Goldfinch	20
House Sparrow	10

ANIMAL FIELD GUIDE ENTRY FORM

(Draw Animal in This Space)

When drawing an animal, make a sketch of the basic shape first. Then fill in the details

Date: _____ **Time:** _____ **Location:** _____

Description of Habitat: _____

Type of Animal: _____ **Approx. Length or Height:** _____

Wingspan: _____ **Species Name** (if you know, imaginary name if you don't): _____

_____

Sex (if you can determine it): _____ **Nature of Body Covering** (fur, feathers, bare-skinned, etc.): _____

_____

Overall Description (Include coloration of upper and lower body, and the type, shape and arrangement of body parts, such as legs, feet, main body, head, tail, beak, etc.): _____

_____

_____

_____

Key Field Marks (Describe special markings and features): _____

_____

_____

Adaptations (If the animal is a bird, what type of beak and foot adaptations does it have? Use the Adaptations Guide in your Discovery Manual.) _____

_____

Behavior (describe what animal was doing): _____

_____

_____

Nest and/or Young (describe if present): _____

_____

Voice (put into words any vocal sounds made): _____

_____

Total Number of Animal Field Guide Entries _____ **x 100 =** _____ **Discovery Points**

PLANT FIELD GUIDE ENTRY FORM

Draw the leaves, flower, fruit and bark if present in this space.

Draw entire plant in this space.

Date: _____ **Time:** _____

Location: _____

Description of Habitat: _____

_____

_____

Type of Plant (fungi, moss, lichen, grass, wildflower, a soft-stemmed water plant, shrub, tree, other):

_____

Species Name (if you know, imaginary name if you don't): _____

_____

Height: _____

Color and Shape of Flower (if present): _____

_____

_____

Color and Shape of Fruit (seeds, berries, nuts if present): _____

_____

Color and Shape of Leaves (if present): _____

_____

_____

Color and Texture of Stem or Branches (if present):

_____

Total Number of Plant Field Guide Entries

_____ x 100 = _____ **Discovery Points**

Chapter 3: Nature Sleuthwork

Dear Student,

In the first part of this chapter you will be going on an imaginary field trip. Your quest will be to identify the twelve Mystery Bird Species that you will either see or hear during the trip. To do that, you will have to use the Field Guides that you prepared in Chapter 2. All of the Mystery Species you will encounter are shown and described in those Field Guides.

Your next assignment will be to conduct real field trips in natural habitats. Once again, you should use your Field Guides and Discovery Manual as you conduct these outdoor investigations.

The classroom assignment in this chapter is worth 300 Classroom Discovery Points. The outdoor assignment is worth as many Outdoor Discovery Points as you can score. Record the points you score with each exercise in the Discovery emblem. Tally up your final chapter points in the box below. Before you get started, please study the Instructions below.

_____

IMAGINARY FIELD TRIP INSTRUCTIONS

1. You will be accompanied on the imaginary field trip by an expert nature guide whose nickname is **Super Sleuth**. You can meet Super Sleuth by looking at her picture to the right. As you conduct your field trip, you should pretend that you are the person shown beside Super Sleuth. You can go ahead and start doing that by signing your own name on the blank line beside the drawing of the person.
2. When you encounter a Mystery Species during the course of this imaginary field trip you should stop reading long enough to identify it. You can do this by finding the species in one of your field guides and by writing its name on the blank line provided. In some cases, you will actually see the Mystery Bird in the drawing on the page. In other cases, though, there will be no drawing and you will have to make the identification based solely upon its description. In still other cases, you will only hear the Mystery Bird singing or calling, and you will have to find the bird in your Field Guides that has that same voice in order to make the identification.
3. Be sure to note the type of habitat you are in when you spy a Mystery Species. You will then know which of your Field Guides you should use.
4. During the course of the field trip, Super Sleuth will ask you questions about something the two of you have discovered. When that happens, you should figure out an answer and write it on the blank lines provided.
5. Once your work is done, please remember that the field trip was only imaginary. Even though everything you experienced really exists in nature, it would be impossible for a person to find and see that much action in a single day. But that doesn't mean that real life field trips can't be exciting or just as much fun. You will find that out when you take on the outdoor field trips in the second part of this chapter.

Chapter 3 Tally Box

TOTAL CLASSROOM DISCOVERY POINTS _____

TOTAL OUTDOOR DISCOVERY POINTS _____

GRAND TOTAL _____

CLASSROOM DISCOVERY POINTS

An Imaginary Field Trip

YOUR QUEST

Identify the twelve Mystery Species you will encounter during this imaginary field trip.

INSTRUCTIONS

Follow the Imaginary Field Trip Instructions presented in the introduction to this chapter.

PART 1

It's a clear, sunny morning in June. You and Super Sleuth are standing along the shoulder of an old country road. The habitat stretching out before you is a large, overgrown field. Super Sleuth has her hand cupped to her ear. You are searching the field with your binoculars.

"I've spotted them," you exclaim. "There are three birds all together — perched over there in a tree. The bird in the middle is light grayish-brown. The other two are glossy black but they have brown heads. Can you see them?"

"Ah, yes," confirms Super Sleuth. "The brown bird in the middle is a female. The black birds on either side of her are males."

"Why is the male on the higher branch behaving so strangely?" you ask. "See how he is leaning so far forward it looks as if he is going to topple over onto the ground? He's also got his feathers all ruffled up and his wings and tail spread wide open."

"That's a good observation, my friend. That male bird is striking a peculiar pose, but I can assure you that his behavior is quite normal. He is simply putting on a courtship display. The other male will probably start displaying any minute now. You see, the two male birds are competing with each other. The male that can display himself the most agressively will be the dominant male in this area. He then will have an opportunity to mate with the female. Listen, I can hear the males singing now, that is also a part of their courtship display."

You concentrate and before long, you hear a bubbling "bablowcomsee" followed by a long squeaky whistle.

"Can you identify the birds?" asks Super Sleuth. They are Mystery Species #1.

Mystery Species #1 _____

By the time you have identified Species #1, Super Sleuth has walked several hundred yards

(cont. on next page)

further down the side of the road. When you start running to catch up with her, she spins around and presses her forefinger to her lip. "Be very quiet," she is motioning.

Slowing down your pace, you creep toward Super Sleuth. From the ground very close to her, you can hear what sounds like an animal calling "killdeah, killdeah". Then, before you know it, you are standing practically right on top of this bird and its nest. As you stare at the bird, it starts to move away from its nest, calling piteously and dragging its wing and tail on the ground.

"What is going on?" you whisper to Super Sleuth. "Is this bird hurt?"

"No, don't worry," she replies softly. "The bird is trying to fool us. Do you see how it is drooping one wing? The bird wants us to believe it has broken that wing."

"Why?"

"Well, you see, if we were two hungry foxes, we'd go for the bird instead of wasting time with its eggs. Thinking the bird was wounded and easy prey, we'd follow it as it led us away from the nest. Then once we were far enough away from the nest, the bird would stage a remarkable recovery and fly away. We two foxes would be left on the ground and hungry."

"It sounds like a really good trick," you laugh. "It's too bad we're onto it."

"Yes, but the bird has nothing to fear from us. All we want to do is identify it. Can you do that? It is Mystery Species #2.

Mystery Species #2 _____

Once you have identified Species #2, Super Sleuth tells you she'd like to strike out across the old field habitat. "There's no telling what we might discover next."

As you and Super Sleuth move deep into the field, the sun climbs steadily in the sky. In every direction, there are colorful wildflowers glistening in the light. It is while you're watching a butterfly skipping over the blossoms of an oxeye daisy that Super Sleuth tugs at your sleeve.

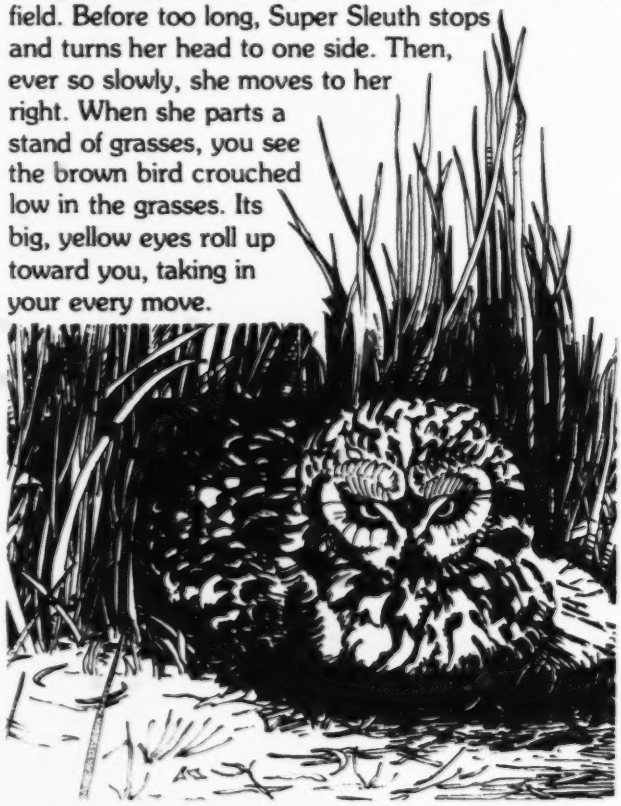
"Get out your binoculars," she whispers. "Aim low and straight ahead."

With a quick scan of your binoculars, you pick up what Super Sleuth is talking about. It is a large, light brown bird flying low over the grasses. A mouse is dangling from its feet. Before you have a chance to see much more, the bird drops into the cover of the grasses.

"Hurry," whispers Super Sleuth, "let's see if we can find that bird on the ground."

"O.K.," you say, "lead the way."

As you might do on a midnight raid to the refrigerator, you and Super Sleuth sneak across the field. Before too long, Super Sleuth stops and turns her head to one side. Then, ever so slowly, she moves to her right. When she parts a stand of grasses, you see the brown bird crouched low in the grasses. Its big, yellow eyes roll up toward you, taking in your every move.



"Take a good look," whispers Super Sleuth. "This is a rare species in our area. Too much of its natural grassland habitat has been destroyed for development."

"What do you think happened to the mouse?" you whisper.

"The bird has probably already swallowed it. But come on, let's move away. Then you can work on the identification of Mystery Species #3."

Mystery Species #3 _____

(cont. on next page)

As you are wrapping up the identification of Mystery Species #3, Super Sleuth places what looks like a grayish wad of dried fur in your hand. Picking apart the wad with your fingers, you see and feel small pieces of bone, and bits of feathers and hair. You also discover what appears to be the skull of a mouse and the sharp beak of a bird. "What is this?" you ask of your guide.

"It's called an owl pellet," she replies. "I found it in the area where we saw the short-eared owl. Owls and some hawks cough up and spit out pellets like this. Why do you think the birds get rid of pellets through their mouths rather than through their lower digestive tracts?"

You answer: _____

_____

_____

_____

"That's a good answer," confirms Super Sleuth. "I don't think my intestines could handle the jaw of a mouse. But what do you say? Are you ready to go and investigate the lake on the other side of this field?"

PART 2

It is now early afternoon. You and Super Sleuth are investigating the marshy edge of a lake. In a shallow area directly across from you, there is a dark, greenish gray bird crouched motionless, its eyes riveted on the water.

"Don't take your eyes off of that bird for a second," cautions Super Sleuth. "It can catch a fish faster than you can blink."

Nodding at Super Sleuth's warning, you settle in for what could be a long wait. The bird is holding stone still. Not one muscle in its long thin neck is quivering. Poised low over the water, its beak is ready to strike. And strike it does — all in an instant. With the water rippling into gentle circles, the bird lifts its head high. A small fish is pinned firmly in its beak.

"You have just seen a bird who rarely misses its prey," says Super Sleuth as she swings her binoculars down from her eyes. "It's Mystery Species #4."

Mystery Species #4 _____

As you are finishing up the identification of Species #4, Super Sleuth puts a question to you. "The green-backed heron takes a lot of small fish out of this lake. Do you think the feeding habits of the heron are destructive or beneficial to the overall well-being of fish populations in the lake? And please, tell me the reasons for whatever answer you have."

You think carefully about Super Sleuth's question and then answer: "_____

_____

_____

_____

_____."

After listening to your answer, Super Sleuth states that the fish in the lake do indeed benefit from the actions of the heron. "By feeding heavily on fish, birds like the heron help to keep the overall population in check. Without predators, the fish population would exceed the amount of food, space, and oxygen available for fish in the lake. Fewer fish then would be able to grow to full size. That is very important because large fish are a major source of food for many birds and mammals..."

"Not to mention people," you add.

"Very well put, my friend," chuckles Super Sleuth. "What else do you have to tell me?"

"Well, only this. I think I've spotted another Mystery Species."

"Where?"

Pointing out across the lake, you describe the bird you see to your guide. "It's a small, brownish bird swimming in the water. It has a patch of black

(cont. on next page)

on its throat and a black ring around its beak. I think it has seen us because it is sinking slowly into the water. Only its head is above the surface now."

"Ah yes, I see it now. That bird is known for its habit of sinking into the water. Sometimes, it slips into the water to hide from predators. Most of the time it slowly slides beneath the surface to swim underwater in pursuit of tadpoles and fish. Can you identify Mystery Species #5"?

Mystery Species #5

Once you have identified Mystery Species #5, you look back at it. That is when you see a large shadow pass over the water.

"Quick," urges Super Sleuth. "Let's take cover in these reeds."

From your crouched position in the reeds, you can see what is casting the shadow over the water. A large bird is flying fairly high above the lake, but it is dropping fast. In what seems like just a few moments, it is zooming just over the water surface. With a quick motion, it lowers its legs and plucks a big fish out of the water. As it lifts back into the sky, you sit down with a thud; your heart is racing.

Super Sleuth is pretty excited too. "We were really lucky to see that bird. Mystery Species #6 is an endangered species."

Mystery Species #6

After you have finished identifying species #6, Super Sleuth says it is time to explore the forest on the western side of the lake.

"O.K.," you say, "but before we go, I have a question for you. How did the bald eagle know from way up there in the sky that there was a fish moving in that exact spot?"

"Good question," replies Super Sleuth. "It's pretty incredible but the bald eagle can spot prey from a distance of two or three miles away. All birds of prey have developed especially keen powers of sight and hearing. Remember the short-eared owl that we saw earlier? It can hear the footsteps of a beetle at a distance of 100 yards, and the squeak of a mouse at a distance of one-eighth mile!"

"I guess our sneaky approach on the short-eared owl was no big surprise then, huh?"

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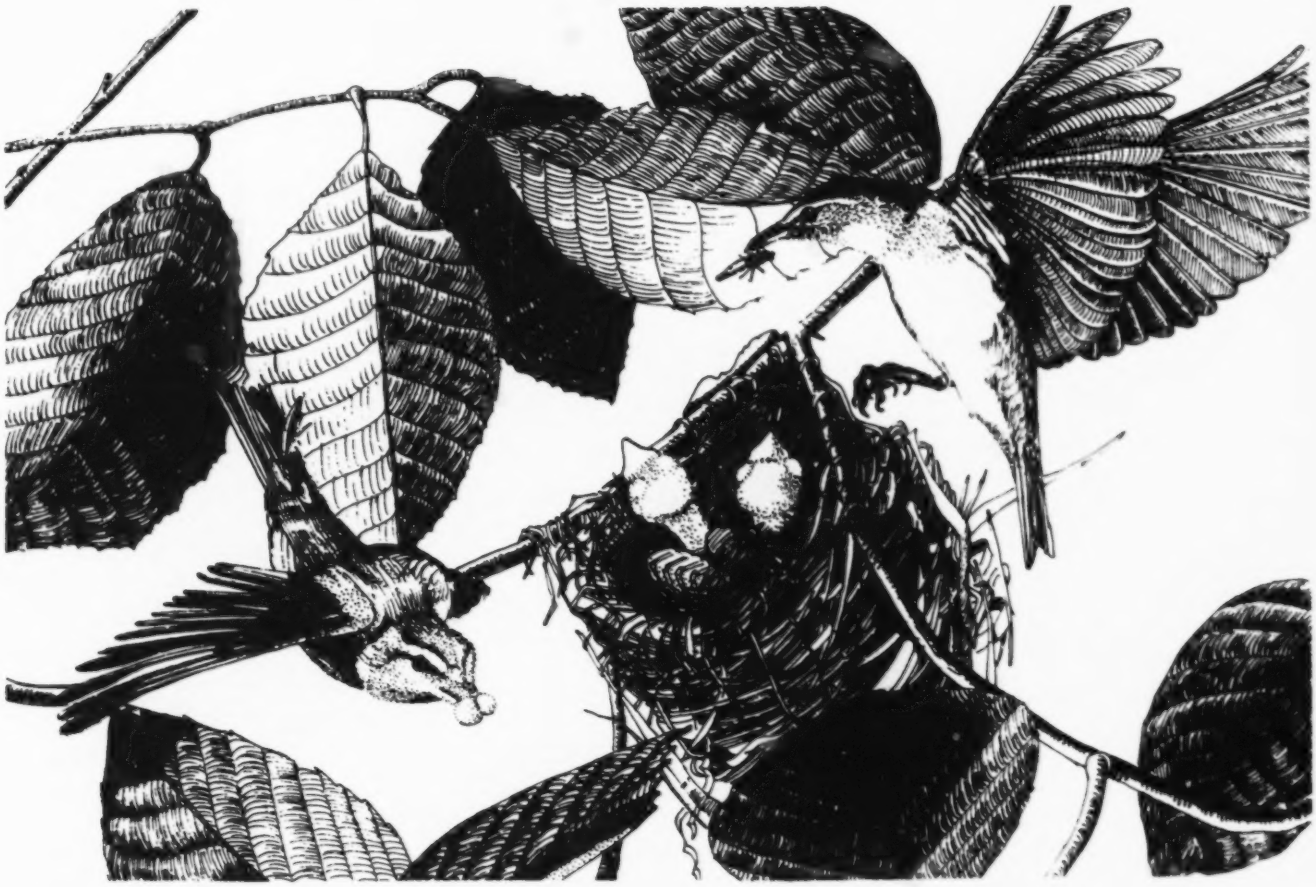


PART 3

It is now mid to late afternoon, and you and Super Sleuth are working in the deep, shady forest. For the last few minutes, you have been spying on a pair of small, greenish birds at their nest. One of the birds is just now carrying the droppings of the young away from the nest. The other is arriving at the nest with a beetle in its beak.

"Did you see that?" you whisper to Super Sleuth. "The young birds look blind to me, their eyes are still covered with skin. But, when the parent bird landed with the beetle, they seemed to know it right away. They started peeping, and they all reached toward their parent with their mouths wide open."

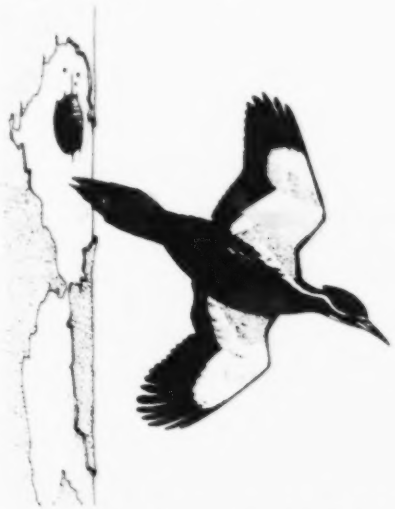
"Yes, I know. You see, the vibrations made by the parent bird on the brim of the nest signaled the young birds it was time to beg for food. And you're right, they are still blind. In a few days, though, their eyes will be open, and in just 12-14 days, they will be fully feathered. Then, they will be ready to "fledge", or leave the nest."

"Who are these birds?"

"You tell me," smiles Super Sleuth. "They're Mystery Species #7."

Mystery Species #7 _____

With the identification of Species #7 complete, you and Super Sleuth walk on through the forest. Before too long your guide stops and points into the high branches of a dead tree. Then, very suddenly, there is an explosion of movement. You see a flash of black and red, and you hear wings flapping and whirling.



"Whoaa, that was quick," sighs Super Sleuth. "But it's no wonder the big bird took off. Mystery Species #8 is very shy and secretive.

Mystery Species #8 _____

Once you have identified Species #8, your guide walks with you steadily southward. You can tell that the number of trees are starting slowly to thin out. Up ahead, you can see the edge of the forest blending into the field in which you started your field trip. When you stop to look at how the shady forest is giving way to the sunny field, a glob of thick, whitish guck splats onto your tennis shoe. Very quickly, you look up and see a black-winged bird perched in the high limb of a wild cherry tree. On the bird's breast there is a beautiful triangular patch of rosy red.

"Hah," laughs Super Sleuth. "Mystery Species #9 just gave you a present. Can you repay the favor by identifying it?"

Mystery Species #9 _____

After you have given Species #9 a name, you use a piece of bark to scrape its dropping off your shoe.

"See any seeds in the dropping?" asks Super Sleuth.

"Yes, I see a lot of them."

"How do you think they got there?"

You answer " _____
_____
_____
_____."

"That's good thinking. Can you now tell me one of the ways birds help plants to reproduce?"

You think about birds moving through woodlands and across fields and answer " _____
_____
_____
_____
_____
_____."

It is while you are answering Super Sleuth's last question that you hear the distress calls of birds not too far away. Without saying a word, you and Super Sleuth start out in pursuit.

You are the first to spot the birds. Almost at the very edge of the forest, the birds are screaming and hovering a few feet above the ground. From what you can see they are about the same size as a robin, and they have a lot of black spots on their breasts.

You motion to Super Sleuth and you both take cover. With your binoculars, you can see that the birds are hovering above a large, bluish gray snake moving along the forest floor. "That's a blue racer," whispers Super Sleuth.

The snake is hissing at the birds but they don't seem to care. They are shrieking and flapping their wings furiously. One bird takes a courageous dive at the snake, but then it retreats at the last moment.

"What is happening?" you ask.

"The birds are trying to scare the snake but they don't dare get too close."

"Will the snake back off?"

"I guess we're never going to know. The screaming and chattering attracted us to the site, and something else has heard it as well. Look up there and you'll see it."

You look up into the sky ahead of you. A large brown bird with two white bands across its tail is diving through the air at a terrific speed. In no time, the bird is cruising parallel to the forest floor. Then, pumping the air with its wings, the bird lowers its legs and zeros in on the snake. BAM! Its talons hit the snake's neck and sink clear through it.

The snake fights back by whipping its long, powerful body and tail. But the bird has a griplock that cannot be broken. When the bird raps the snake's head with its hooked beak, the snake falls still. The battle is over.

Before the leaves have had a chance to settle, the bird is aloft with its prey. The two smaller birds are long gone, and Super Sleuth is nudging you. "What are you waiting for?" she says. "The two birds that were harassing the snake are Mystery Species #10. The bird that snared the blue racer is Mystery Species #11.

Mystery Species #10 _____

Mystery Species #11 _____

As you are finishing up the identification of the two mystery species, Super Sleuth taps you on the shoulder. "Tell me," she says, "why do you think the wood thrushes were harassing the snake? They could have just flown away."

You think for a moment about the possible motivations of the wood thrushes and answer, " _____
_____
_____
_____
_____
_____."

Super Sleuth nods at your answer and the two of you start the long trek back to your camp. With the setting sun as your compass, you cross the field and then turn westward down the old country road.

"I guess our field trip is over for today," you say.

"Not quite yet," cautions Super Sleuth as she pauses to tune into the sounds around her. "Listen carefully to the evening serenade. I can hear crickets chirping in the field and frogs croaking at the edge of the lake. From the distant forest, I am picking up the low, mellow hooting of a large bird that is active only under the cover of darkness."

"It sounds a bit like a foghorn," you whisper as your ears isolate the hooting. Then, from deep in your throat, you imitate the call, "WHOO-WHOOO-WHOOOOOOOO."

"Good work, my friend. Go ahead and identify Mystery Species #12 and our fieldwork will be done. It's been a good day."

Mystery Species #12 _____

OUTDOOR DISCOVERY POINTS

Taking Outdoor Field Trips

YOUR QUEST

Conduct exploratory field trips in natural habitats.

INSTRUCTIONS

During the previous exercise, you went on an imaginary field trip. As you work to complete this activity, you will be taking a series of real life field trips. And you won't be spying just on birds. You will be investigating total environments, including a variety of plants and animals. This is because the environment is as much a part of the bird as the bird is part of the environment.

This activity is divided into six parts. Parts 1 and 2 provide a framework for parts 3 - 6, so study them carefully before you begin your field work. In fact, for the best results, you should read over all of the parts before you start. Then, you'll be aware of everything for which you should be on the lookout. Also, you should gather up your Discovery Manual and Field Guides as they may be very helpful to you as you conduct your fieldwork. **Good luck and good viewing!**

PART 1 - ANIMALS

As you explore the different types of habitats in parts 3 - 6, you should keep your eyes peeled and your ears open for the presence of birds and other animals. Be on the lookout for animal nests and tracks also. When you observe at least one of the animals or items in the categories below, check the box. If you locate more than one in a category, keep a running tally on the blank line. Once you have completed the entire field trip, multiply the total number of items seen in each category by the base score to arrive at your final score. **BONUS:** *If you can identify any of the animals, make a list of their names on a separate sheet of paper and double your base score for those animals only.*

Your Points	Base Discovery Point Value		Discovery Items to Locate and Observe
_____	20	☐	worms. _____
_____	20	☐	insects, including butterflies, moths and caterpillars. _____
_____	25	☐	crayfish. _____
_____	20	☐	snails and mussels (clams). _____
_____	25	☐	fishes. _____
_____	25	☐	amphibians (frogs, toads, salamanders, tadpoles). _____
_____	25	☐	reptiles (snakes and turtles). _____
_____	25	☐	birds. _____
_____	25	☐	mammals. _____
_____	20	☐	animal songs, calls or squeaks. _____
_____	30	☐	animal nests. (For every nest that you sketch and describe, double your points.) _____
_____	30	☐	animal tracks. (For every set of tracks that you sketch and describe, double your points.) _____

_____ **Subtotal**

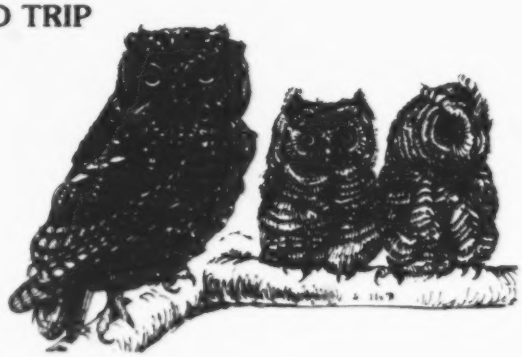
PART 2 - FIELD GUIDE ENTRIES

If you prepare field guide entries for the plant and animal species you spot during this activity, you can earn 100 additional points per field guide entry. Use the two field guide entry forms shown at the end of Chapter 2. One of the forms is for plants, the other is for animals. Tally up the total points you earn preparing field guide entries below. You can score these points regardless of the points you may score with the same plants or animals in other parts of this activity.

Total Number of Plant Field Guide Entries Prepared	_____ x 100 _____
Total Number of Animal Field Guide Entries Prepared	_____ x 100 _____
Subtotal for Part 2	_____

PART 3 - FOREST FIELD TRIP

To complete the rest of this activity, you will have to locate and conduct a field trip in a variety of natural habitats. In this part, you will be working with a forest habitat. If you observe a Discovery Item, check the box. If you can identify a species, write its name on the blank line and double your base score for that item only. Be sure to work with parts 1 and 2 as you investigate the forest habitat.



Your Points	Base Discovery Point Value			Discovery Items to Locate and Observe
_____	20		☐	a forest habitat.
_____	20		☐	identify the type of forest (deciduous, coniferous or mixed)._____
_____	20	_____	☐	a large tree (over 60 feet tall).
_____	20	_____	☐	a medium-sized tree (over 30 feet, less than 60 feet tall).
_____	20	_____	☐	a small tree (under 30 feet tall).
_____	20	_____	☐	a shrub (less than 15 feet tall, has low, thickly spreading limbs, bush-like).
_____	25	_____	☐	a woodland wildflower (primarily found blooming in spring and early summer).
_____	30	_____	☐	a fungi (a mushroom-type organism, free-standing or attached to a tree or log).
_____	30	_____	☐	moss.
_____	30	_____	☐	lichen.
_____	20	_____	☐	a dead or dying tree. (Double your points if you find one with a hollow nesting cavity).
_____	30		☐	a climbing or trailing vine.
_____	100		☐	an owl pellet. (Owls and some hawks cough up, as a pellet, the indigestible parts of the animals they eat. A pellet is a tightly packed wad of bones, fur, teeth, and claws).
_____	20		☐	evidence of decaying plant and/or animal material. (Through the process of decay, the nutrients in dead plants and animals are recycled back into the physical environment. Decay is caused by organisms, such as fungi and bacteria, which are known as decomposers. As decomposers feed on animal bodies and plants, they break them down into important nutrients such as carbon and nitrogen. These nutrients are then stored in the soil, air, and water until they are absorbed by living plants. This is how the nutritional resources of an ecosystem are recycled).

_____ **Subtotal For Part 3**

PART 4 - OPEN-COUNTRY FIELD TRIPS

Locate and investigate an open grassland and/or brushland habitat to complete this part. Be sure to work with parts 1 and 2 as you investigate the habitats.

Your Points	Base Discovery Point Value			Discovery Items to Locate and Observe
_____	20		☐	a grassland habitat.
_____	20	_____	☐	identify the type of grassland habitat (old field, prairie, currently farmed field, river bottom grassland, meadow, pasture, vacant lot, grassy roadside, airport, golf course, other).
_____	20		☐	a brushland habitat.
_____	20	_____	☐	identify the type of brushland habitat (brushy area in or at the edge of a grassland, shrubby or wooded roadside, brushy area at the edge of a forest, brushy fencerow, other).
_____	20	_____	☐	a grass plant (grass-like stems and leaves, no blooming flower).
_____	25	_____	☐	a seed-head on the end of a grass plant (will look like a cluster of tiny seeds).
_____	20	_____	☐	a wildflower (broad leaves, may have a blooming flower in spring or summer).
_____	20	_____	☐	a shrub or small tree.
_____	30	_____	☐	a butterfly, bee, or other insect feeding on a flowerhead. (Many insects feed on the pollen and/or nectar found in flowers. As an insect feeds on one flower, pollen rubs off onto its body. When the insect moves to another flower, the pollen of the first flower rubs onto that second flower. The new pollen fertilizes the seeds in the flower and they begin to grow. This transfer of pollen is called pollination. The insects that help make it possible are called pollinators).
_____	40	_____	☐	The grass runway of a mouse or mole (an enclosed runway along the ground roughly the size and shape of a garden hose).
_____	20		☐	a forest-edge habitat along the outer borders of the grassland.
_____	100		☐	an owl pellet.
_____	30		☐	animal feces or droppings.
_____	**Subtotal For Part 4**			

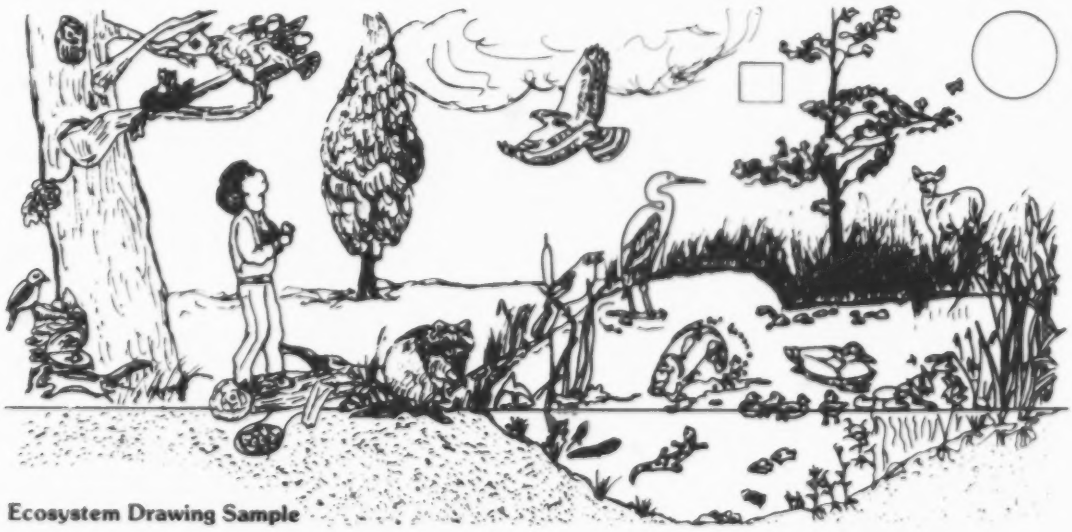
PART 5 - FRESHWATER WETLAND FIELD TRIPS

Locate a freshwater wetland habitat to complete this part. Be sure to work with parts 1 and 2 as you investigate the habitats.

Your Points	Base Discovery Point Value	Name		Discovery Items to Locate and Observe
_____	20		☐	a freshwater habitat.
_____	20	_____	☐	identify the type of freshwater habitat (marsh, swamp, pond, lake, river, creek, stream, other).

PART 5 - FRESHWATER WETLAND FIELD TRIPS, Cont.

_____	20	_____	☐	emergent water vegetation (cattails and bulrushes and the like that root in the bottom but reach above the water level).
_____	20	_____	☐	rooted floating water vegetation (plants like American lotus commonly known as water lilies. These are rooted but their pads and flowers float on the water).
_____	25	_____	☐	rooted submerged water vegetation (plants like coontail that are rooted but their stems and leaves are submerged or below the water surface).
_____	25	_____	☐	free-floating water vegetation (delicately leaved vegetation, like pondweed that are not rooted, and float in the water or along the water surface).
_____	25	_____	☐	algae on the surface.
_____	20	_____	☐	grasses and other small green plants along the shore or in areas near the shore.
_____	25	_____	☐	the seed head of a shore plant or water plant.
_____	25	_____	☐	the blossoming flower of a shore or water plant.
_____	20	_____	☐	shrubs or small trees at water's edge or nearby.
_____	20		☐	mats of dead water vegetation (rafts of fallen leaves and stems that form platforms for animals to hide and walk on).
_____	50		☐	jelly-like eggs floating on or submerged in the water.
_____	30		☐	animal feces or droppings.
_____	20		☐	shells along the shore.
_____	**Subtotal For Part 5**			



Ecosystem Drawing Sample

PART 6 - ECOSYSTEM DRAWINGS

Each of the habitats you explored in Parts 3 - 5, is part of a working ecosystem. Your challenge now is to draw one of those ecosystems on a large, poster-sized piece of paper. For each ecosystem drawing that you complete and present to your class, award yourself 300 Discovery Points. Before you get started, carefully review the Discovery Terms in Chapter 1, ***Ecosystem, Photosynthesis, Food Chain*** and ***Food Web***. Then select one of the habitats that you have investigated in this activity. Following the guidelines described on the next page, prepare a drawing of the ecosystem within that habitat.

Total Discovery Points for Part 6 _____

GUIDELINES FOR DRAWING AN ECOSYSTEM

1. Begin your drawing by laying out the physical foundation of the ecosystem. This foundation is formed by the atmosphere, soil, and water. As is shown in the sample on the previous page, draw a cross-section of the soil and/or water. Be sure to include a sun to represent sunlight and clouds to represent rainwater and moisture in the atmosphere. Draw a box labeled air to represent oxygen and other vital gases.
2. Next, draw and label the different types of plants found in the ecosystem. Try to show a wide variety of plant types. *(The Discovery Items listed for the habitat you are working with are an excellent reference for typical plant types. Your Bird Field Guides are also a good reference for plants.)*
3. Draw next some of the animals that you either saw, or think would be found, in that type of ecosystem. Include as many different species as possible. At a minimum, put in at least six bird species, ranging in size from small to large. Also, put in some large, medium, and small-sized mammals. Don't forget to put in several fishes (if appropriate), amphibians, reptiles, insects, spiders, butterflies, and worms. *(Your Field Guides are an excellent reference that you can use to determine some of the birds and other animals typical of specific ecosystems.)*
4. Your ecosystem drawing should now include physical and living parts. To finish up your drawing, we'd like for you to draw and describe some of the ways in which the different parts of the ecosystem are connected into a system of life. By demonstrating how the plants and animals interact with their environment, and with each other, your drawing will reflect what an ecosystem really is — a self-supporting community of life. To show some of the relationships occurring with the different parts of your ecosystem, draw in the features A-K listed below. On a separate sheet of paper, write the heading, "Some of the Ways the Parts of an Ecosystem Work Together to Keep the Ecosystem Functioning Properly." Then, as you draw in the features A-K, answer on that sheet of paper the italicized questions accompanying the features. If you can think of other features to put in the ecosystem to show relationships between the different parts, please do so. Once you are done, use your drawing and what you have written to present an oral report to your classmates about the ecosystem you have created.

Ecosystem Features

A. From the sun, draw rays of sunlight. *What do you know about how plants use sunlight to produce food energy? Explain fully why plant food is a critical part of the food supply in an ecosystem?*

B. From the cloud, draw raindrops. *In how many different ways is water crucial to the well-being of the ecosystem community?*

C. From the air box, draw small arrows radiating to the different areas of the ecosystem. *Describe the value of oxygen in the ecosystem.*

D. Beneath one or several of the plants, draw some roots reaching down into the soil. Then, draw an arrow in the soil so that the pointed tip is at the end of the roots. If you have drawn a plant whose roots float in water, also draw those roots in the water. *What are the different things you think plants absorb through their roots, and why is this absorption important?*

E. In the soil, draw the burrow of an animal. Try also to draw an animal entering the burrow. *Describe several different ways in which animals use the soil and/or water of an ecosystem.*

F. Draw at least three animal nests in the vegetation of the ecosystem. (For bird nests, the Nest Guide in your Discovery Manual is an excellent reference.) *Describe the different ways in which animals use plants to meet their needs.*

G. From several of the plants, draw green arrows to several of the animals that you think are plant-eaters. From those plant-eating animals, draw arrows to any of the animals that you think might feed on plant-eating animals. *Have these arrows created a food web in the ecosystem? If no, explain why. If yes, discuss how food energy is flowing back and forth through the lines of the web. If there are any animals in the ecosystem that you think are at the top of their food chains, circle them.*

H. Draw the dead body of an animal and some decaying plant material (leaves, sticks, etc.) in one area of the ecosystem. From the dead materials, draw small arrows into the soil, water and atmosphere. *Explain what you know about how dead plant and animal material is recycled back into the food supply of the ecosystem.* (You can use the information about the process of decay at the end of the part 3 as a reference.)

I. If you haven't already done so, draw a butterfly, bee or fly feeding on the nectar of a flowering plant. *Explain the role certain insects play in the process of pollination.* (Use the information about insect pollinators in Part 4 as a reference.)

J. Draw a seed or berry in the beak of a bird. Then, from that bird, draw an arrow all the way to the soil. *Explain how you think birds and other animals spread the seeds of plants throughout the ecosystem.*

K. Draw a person into your ecosystem. Show the person going about any activity you like. *Do you think people are as much a part of the ecosystem as the other animals? As you explain the reasons for your answer, describe fully the relationship you think exists between people and natural ecosystems.*

Chapter 4: Making Environmental Decisions

Dear Student:

We, as human beings, share the natural environment with all forms of life. But unlike other species, we have the power to make decisions about how our environment is to be used and treated.

Over the last several hundred years, our decisions have had an enormous impact on the natural environment. To meet the growing needs of our society, we have decided to clear forests, drain wetlands, and plow natural grasslands. We have opted to spray deadly pesticides over our croplands. Our soil, air, and water, we have used as a garbage bucket for industrial and residential wastes.

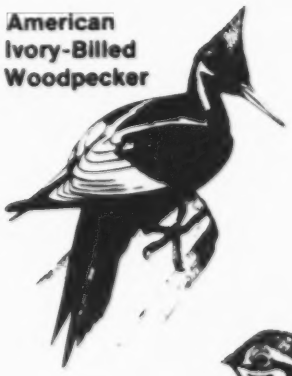
Many forms of life have failed to survive because of the environmental decisions we have made. The American ivory-billed woodpecker and heath hen vanished when their natural habitats were destroyed. The heath hen was given an extra push into oblivion by unregulated hunting. Like the Carolina parakeet, passenger pigeon, and great auk, these once-common birds are extinct — lost to this planet forever.

Many other species are in grave trouble as a result of our decisions. Like the bald eagle, the peregrine falcon and osprey are victims of pesticide poisoning and habitat destruction. Certain pesticides affect the shells of eggs laid by these birds. The abnormally thin-shelled eggs simply crack open in the nest, exposing and killing the young birds.

Despite the damage that has already occurred in our environment, the future is not without great hope. Just as we can choose to impact the environment in negative ways, we can also choose to affect our environment in positive ways.

The peregrine falcon, osprey, and bald eagle are already faring better because of the positive decisions we have made. Important habitat areas are being set aside and protected. The deadly pesticide DDT has been banned in the United States. Peregrine falcons are being bred in captivity and released into the wild. Artificial nesting platforms are being put up along many of our waterways for ospreys.

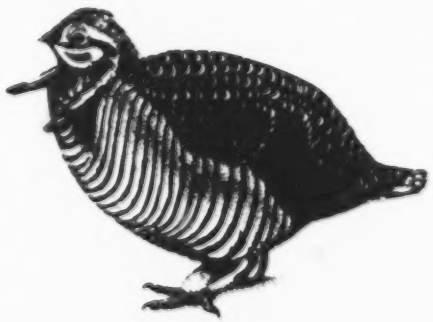
This chapter is about the kind of environmental decisions each and every one of us may be faced with during our lives. You will find one classroom assignment worth 100 Classroom Discovery Points and one outdoor or out-of-the classroom activity worth 200 Outdoor Discovery Points. After you have completed the assignments, enter your final scores in the Tally Box below.



American Ivory-Billed Woodpecker

Osprey

Peregrine Falcon



Heath Hen

Chapter 4 Tally Box

TOTAL CLASSROOM DISCOVERY POINTS	_____
TOTAL OUTDOOR DISCOVERY POINTS	_____
GRAND TOTAL	_____

Resolving Environmental Dilemmas

YOUR QUEST

Make decisions that affect birds, the environment, and yourself.

INSTRUCTIONS

Eleven simulated situations are described on this page and the next three pages. Each situation features a person who is faced with making a decision. The decision made will affect the person and possibly his or her family. The decision will also have an impact upon birds and, in some cases, the environment as a whole.

It is your job to pretend you are the person involved in each situation. It is also your responsibility to make a decision after you have carefully reviewed the facts of the situation. As you work, please remember there are no correct or incorrect decisions except in those cases where there is a specific law involved. Environmental decisions can be difficult to make. In many cases, the needs and desires of people have to be weighed against what is best for the environment. We want you to make the decisions you feel are best according to your own personal beliefs and values.

As you make your decisions, write them down on a separate sheet of paper. Be sure to include a careful explanation of why you think your decision is wise. Once you are done, compare your decisions with those of your classmates. It would be a very good idea to set up a debate in your classroom, with different students defending different decisions.

Decision Situation #1

One Saturday, you are out exploring your favorite pond. You are working on a science project, and you are hoping to see birds, bird tracks, and bird nests. When you find an empty bird nest in the branches of a shrub, do you:

- take the nest out of the shrub, examine it carefully, sketch it, and then put it back in the branches of the shrub.
- take the nest with you so you can show it to the other students in your class.
- make a sketch of the nest without touching or removing it.
- other (explain).

Note: After making your decision, find out which of these choices is against the federal laws that protect birds.

Decision Situation #2

One spring day, you discover a young bird in your backyard. The bird is sitting on the ground, calling loudly. When you approach the bird, it tries to fly away but it is only able to flutter a few inches above the ground. After inspecting the area carefully, you find no signs of a parent bird. You do see, however, your neighbors' cat asleep on their patio. In response to the situation, you decide to:

- leave the young bird where it is.
- pick up the young bird and put it in some bushes.
- take the young bird inside so you can feed it until it is able to fly.
- take the young bird to an animal shelter.
- other (explain)

Note: After making your decision, find out which of these choices is against the federal laws that protect birds.

Decision Situation # 3

You and your family have been operating a feeding station for birds during the winter for many years. Usually, the birds start feeding at your station in early November and continue to do so until spring. This particular winter you and your family are going on a two-week vacation during January. In regard to the operation of your feeding station while you are gone, do you:

- let the birds fend for themselves.
- put out a two-week supply of bird seed and suet.
- make arrangements with a neighbor to have fresh bird food put out daily.
- other (explain).

Decision Situation #4

A week or so ago, you put up a nesting box for bluebirds in your backyard. You have seen bluebirds in the area, and you built the box because you know bluebirds are in need of places to nest. Many years ago, bluebirds could find plenty of natural nesting cavities in trees and fence posts. Now there is a shortage of natural nesting cavities because a lot of hollow trees have been cleared away from the landscape, and old wooden fence posts are being replaced with steel stakes. Also, bluebirds are often forced out of natural nesting cavities by more aggressive starlings and house sparrows. The starling and house sparrow are two species that were unwisely imported into the United States from Europe. These feisty birds are quick to fight and are driving many of our native species away from the cavity nests they need for survival.

When you see a pair of starlings carrying nesting materials (twigs and leaves) into your new bluebird box, do you:

- open up the bluebird box every day and take out the twigs and leaves until the starlings give up and abandon the box.
- shoot the starlings with a B B gun.
- stand by the box and wave a brightly colored towel at the starlings.
- do nothing, hoping the starlings will not return to use the nest next year.
- build and put up another bluebird nesting box.
- other or a combination of above (explain).

Decision Situation #5

You are a fifth grader. You and your best friend are playing catch in the backyard. After the two of you have grown bored with your game, your friend challenges you to participate in a new sport. When you ask what the sport is, your friend says you both can shoot birds with a B B gun. Your friend has already bagged several robins, a cardinal and a bluejay. Sometimes, your friend hunts in the park across the street; but most of the hunting has been done right there in the backyard.

After your friend has gotten the gun and is ready to start, do you:

- watch your friend try to target and shoot birds but say that you don't want to give it a try.
- take the B B gun so that you can try out your skills at shooting birds.
- watch your friend try to target and shoot birds but then tell your friend's parents about it later.
- say that you don't want to shoot birds and that you don't think your friend should either.
- other (explain).

Note: After your discussion, find out what the law is in your area about owning and using a B B gun. Does what you find out change your decision on this situation? What laws apply to shooting songbirds?

Decision Situation #6

You and your family have recently bought a house situated on ten acres of mature forest. In one corner of your property, there is an abandoned apple orchard.

You and the other four members of your family have had a series of discussions about what you should do with your land. Everyone feels the land is very important to birds and other wildlife. There are hawks, woodpeckers, and warblers in the forest. In the apple orchard, you have seen bluebirds and wrens nesting and feeding. On quiet nights, you have heard the lonely singing of owls in the orchard.

Everyone also agrees that the land is very important to the well-being of your family. Your family members disagree, however, about what should be done with the land. Two family members feel the land will be the most valuable to them if it is left in its present condition. That way they could continue to enjoy its wild places and animals. Two other members of your family feel the land will be the most valuable if it is used to produce money. They suggest harvesting the lumber in the forest and getting the orchard back into production. They point out the land could be used in this way to help pay the mortgage and property taxes.

As the fifth member of your family, you are asked to express your opinion about what should be done with the land. Do you suggest:

- clear-cutting the forest to sell the lumber and getting the orchard back into production by pruning the trees and spraying insecticides to rid the area of harmful insects.
- selectively harvesting the forest to make money and getting the orchard back into production by pruning the trees and putting up nesting boxes to attract insect-eating birds and bats. (When a selective harvest is conducted, some of the trees are cut but a mix of small, medium, large, and dead trees is left standing.)
- leaving all of the land as it is.
- leaving the forest undisturbed and getting the apple orchard back into production by pruning the trees and putting up nesting boxes to attract insect-eating birds and bats.
- other or some combination of the above (explain).

Decision Situation #7

Ever since you turned 16, you have been in charge of gathering your family's firewood. Most of the wood you are able to get out of the forest your family owns. Some of the trees you cut were alive. The logs of these trees you split and stack so they can dry out for the best burning. You also cut down a lot of dead trees and stumps. This dead wood is already dried out and ready for the fireplace. For kindling, you gather fallen branches from the forest floor.

Recently, you have been wondering if you should be taking so much of the dead wood out of the forest. You know there are important nutrients in the dead trees and fallen branches that are decaying back into the forest soil. These nutrients are used by plants to grow. You also know that many birds and other animals nest in the hollow cavities of dead trees, and that the fallen branches are sources of cover for ground-dwelling animals. On the other hand, the dead wood is easier to cut and does not need drying. Also, you figure you are just one person taking dead wood out of the forest. The forest is large, and there are plenty of other trees that will surely die soon.

When you make your final decision about removing dead wood from the forest, do you:

- decide to stop removing dead trees, stumps and branches.
- decide to reduce the number of dead trees, stumps and branches that you remove.
- decide that the forest can take care of itself and that it is all right to continue removing the same number of dead trees, stumps, and branches.
- decide to continue removing the same number of dead trees, stumps and branches but also that you are going to put up nesting boxes to replenish the supply of hollow cavities for nesting in the forest.
- other or some combination of above (explain).

Decison Situation #8

A wildlife biologist came to your school recently to talk to your class about birds. The biologist told you that quite a few of the birds that summer in North America's woodlands migrate to the tropical rain forests of Central America for the winter. The biologist and other experts are terribly concerned about the well-being of these birds because their winter habitat in Central America is being destroyed at an alarming rate. Forty percent of the tropical rain forest has already been destroyed. If the situation doesn't change, all of the rain forest could be gone within just ten years.

The wildlife biologist explained that much of the rain forest is being cleared to make room for pastureland for farmers so they can raise more beef cattle. These cattle are slaughtered and the beef from them is being sold to fast-food companies in the United States. Since fast-food businesses are booming, the demand for Central American beef (which is cheaper than North American beef) is also booming. This pressure on the Central American rain forest is pushing it closer to extinction every day.

The wildlife biologist concluded the talk by asking you and the other students if you think there is anything you could do to help save the rain forest? You have now given the matter quite a bit of thought and have decided:

- that there is nothing one person can do, and that the Central American countries will have to do something to save their forests.
- that you can help by not buying hamburgers at fast-food restaurants, and by urging your friends and family members to do the same.
- that you can help by writing to your senator and congress person. In your letter, you will say that the United States should try to help Central American countries with their habitat preservation programs.
- other or a combination of the above (explain).

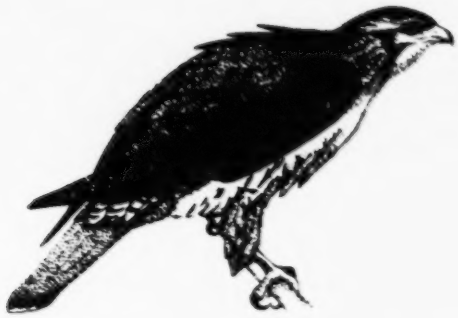
Decision Situation #9

You are 14 years old and you are out in the forest early one morning. You have a pair of binoculars, and you are looking for birds. As you approach a field on the edge of the forest, you catch sight of a man standing there. He is Mr. Smith, the father of one of your friends, and he lives just a few doors down from you. As you call out to Mr. Smith, you can see that he has a rifle strapped over his shoulder. When Mr. Smith hears you, he waves and calls you over to where he is standing.

"Look at this trophy," Mr. Smith says, as he points to a large, dead bird laying on the ground at his feet. "I just bagged this big, old hawk a few minutes ago. I'll get a good price for it from this guy I know. He collects hawks, eagles, and owls and keeps them on display in his den."

While you are kneeling down to look at the hawk, Mr. Smith kneels down next to you and speaks softly. "You know," he explains, "it's not legal to shoot hawks, but I figure I'm not doing any real harm. I'm just one person out to make some extra money to help support my family. Besides, this is a red-tailed hawk, and red-tails are just about the most common hawk around. This one would have died someday, anyway, and I'm just putting it to good use. So what do you say," Mr. Smith asks of you, "would you like to join me in a few hours of

(cont. on next page)



hawk-hunting? If you could just help me spot the birds with your binoculars, I'd cut you in on the earnings."

In response to Mr. Smith's invitation, do you:

- say "no thank you" and continue on your way.
- say "yes" and join him in the hunt.
- say "no thank you" and then hurry home to tell your parents that they should call the police to report Mr. Smith for shooting hawks.
- other or a combination of above (explain).

Decision Situation #10

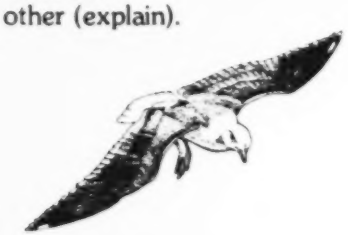
You are 30 years old and the owner of a successful printing business. Within the next year, however, you will have to buy a new, state-of-the-art typesetting system and printing press if your business is to survive. This new equipment will cost $75,000; however, if you don't make the investment, your business will be surpassed by competing printing companies.

To raise the money you need, you have decided that you have two options. First, you could borrow the $75,000 from a bank, using your business and house as collateral. You know that you could handle the loan payments but they would cut into your future profits.

Your second option is to sell the 100 acres of prairie land that you inherited from your parents. The land is over 100 miles from your home, and you don't ever plan to build a new house there. At the present time, your parcel of land is located in a fairly undeveloped area of north central Illinois. You know, however, that some of your neighboring landowners are selling their parcels to large farming corporations for good prices. You expect you could make at least $150,000 from the sale of your land. This would give you extra money that you could use to expand your business sometime in the future. On the other hand, several of your neighboring landowners have asked you not to sell your parcel. They say that if enough people keep their prairie land undeveloped, wildlife will continue to flourish. They add that there is very little virgin prairie left in Illinois, and that several endangered bird species, including the short-eared owl, upland sandpiper and northern harrier are nesting in your prairie.

When you make your final decision about how to raise the money for your business, do you:

- sell your parcel of land.
- sell your parcel of land and donate some of the money to a conservation organization so they can use it to preserve other natural habitats.
- borrow the money from the bank and keep your land undeveloped.
- sell only half of your land and keep the other half undeveloped.
- borrow the money from the bank and donate your land to a conservation organization so you can benefit from the tax write-off.
- other (explain).



Decision Situation #11

You have just graduated from high school and are attending a graduation party at Lake Michigan. Several of your friends are racing beach buggies along the shore and through the dunes. It looks as if they are having a lot of fun, and you think you might like to take a spin in one of the buggies. One of your other friends has just told you, however, that there are a lot of birds nesting in the area. Your friend has already spotted common terns, ring-billed gulls, and piping plovers nesting along the upper beach and in the flat stretches between the dunes. Your friend explains that these birds nest in colonies on the ground. Their speckled eggs and lightly colored young are well camouflaged against the sand.

When you are offered the wheel of one of the beach buggies, do you:

- hop into the beach buggy and chase after your friends.
- hop into the beach buggy and try to steer clear of the area where you see birds.
- say "no thank you" to your friends and suggest to them that they should stop driving along the shore and through the dunes.
- other (explain).

Comparing Environmental Decisions and Opinions

YOUR QUEST

Compare your environmental decisions and opinions with those of others.

INSTRUCTIONS

1. Select four of the decision situations you worked with in the previous exercise.

2. Present the four decision situations to at least five persons who are not in your class. Ask these people to study each situation and make a decision. Remind them there are no correct or incorrect decisions. You want them to make decisions according to their own personal beliefs and values. Also, ask them to explain their reasons for each decision. Record their answers carefully on a separate sheet of paper.

3. After each person has made her or his decisions, ask them to answer the two opinion questions above. Then answer the questions yourself, and carefully compare your opinions with those of the persons you interviewed.

4. As your final step, fill out the **Environmental Decision Comparison Chart**, and the summary section that follows.

OPINION QUESTIONS

Do you believe the well-being of birds, other wildlife, and the environment as a whole is tied to your personal well-being? Please explain fully the reasons why you have this opinion.

Do you think you have a personal responsibility to try to preserve birds, other wildlife, and the environment? Please explain fully the reasons why you have this opinion. Also, if your answer is "yes," please name some of the things you already do or plan to do to help care for wildlife and the natural environment.

ENVIRONMENTAL DECISION COMPARISON CHART

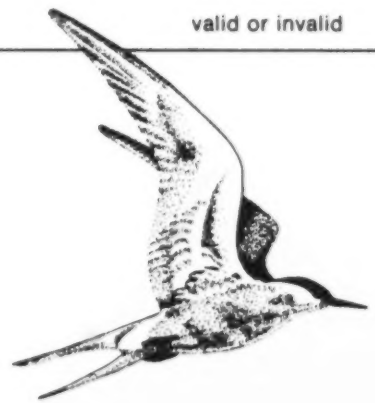
The numbers of the decision-situations you presented.	The number of persons who made the same decision as you.	The number of persons who made a decision different from yours.	Of those that disagreed with you, did you feel they had valid or invalid reasons? Explain separately.
Decision-Situation # _____	_____	_____	valid or invalid
Decision-Situation # _____	_____	_____	valid or invalid
Decision-Situation # _____	_____	_____	valid or invalid
Decision-Situation # _____	_____	_____	valid or invalid

SUMMARY: Including yourself, how many persons seemed to make environmental decisions based:

_____ solely upon their own needs and desires.

_____ solely upon what they felt would be best for the environment, regardless of their own needs and desires.

_____ upon what they felt would be the best compromise between their own needs and the needs of the environment.



Chapter 5: Working With The Nature Discovery Poster

Dear Student,

There are three classroom exercises included in this chapter. The first activity contains information and instructions you will need to complete the Nature Discovery Poster. As you work with the material, you will be labeling and coloring the birds in the poster. You also will be taking a look at their habitats, feeding requirements, and nesting habits. Once you have completed the poster, award yourself 500 Classroom Discovery Points.

The other two classroom activities are each worth 100 Classroom Discovery Points. One is a song you and your classmates can sing about birds. The other is a cut and paste model of a flying bluebird.

In this chapter's outdoor activity, you will find plans that you can use to construct a nesting box for bluebirds. If you and your classmates are able to assemble and place a nesting box, award yourself 200 Outdoor Discovery Points. We also would like to encourage you to build other types of bird houses and bird feeders. Assembly ideas for houses and feeders are included in many bird books and are also available from most conservation organizations. For any additional bird houses and feeders that you construct, and put up, award yourself 200 Outdoor Discovery Points. Enter all of your points for this chapter in the Tally Box below.

Chapter 5 Tally Box

TOTAL CLASSROOM DISCOVERY POINTS	_____
TOTAL OUTDOOR DISCOVERY POINTS	_____
GRAND TOTAL	_____

Illinois Is A Home Address For:

YOUR QUEST

Complete the Nature Discovery Poster

INSTRUCTIONS

This exercise is divided into five parts. Review carefully the instructions in each part before beginning work on the poster. After you have completed the poster, discuss the birds and the things you have learned about them with your classmates.

PART 1. IDENTIFYING THE POSTER BIRDS

Your quest in this first exercise is to identify and label the ten bird species shown on the Nature Discovery Poster. To do that, read carefully the Poster Bird Descriptions shown on this page and on the next page. Then, find the bird in the poster that matches each description. *(There will be a clue beside each bird in the poster to help you make the match.)* For your last step, write the name of each species on the blank line beside its number.

POSTER BIRD DESCRIPTIONS

American Kestrel: (L: 9 1/2" W: 21") This small, rusty red-tailed falcon has blue-gray wings and two black bars on the side of its head. From a telephone wire or tree limb, the kestrel watches over fields and meadows. When its keen eyes pick out a grasshopper, beetle, caterpillar, mouse, or small bird, it springs into the air. Many times, it hovers above its prey before it dives for the catch. While the kestrel hunts in grassy areas, it nests in open woodlands. Usually, a tree hollow or old woodpecker hole is used to shelter the eggs and young.

American Redstart: (L: 5 1/2") This flashy black warbler has patches of bright orange on its wings and tail. Rarely still, the redstart flits about the forest in pursuit of flies, beetles and wasps. Occasionally, it prowls along branches snatching a spider here and a caterpillar there. Female redstarts use plant down, bark strands, and grass stems to build a small bowl-shaped nest in the fork of a tree or shrub. They often weave spider silk into the nest to hold it together.

Barn Swallow: (L: 6 - 7 3/4") This dark blue-backed bird is best told by its deeply forked tail. A

powerful flyer, the barn swallow spends most of its time speeding low over the ground hunting flying beetles, wasps, bees, flies, and moths. Usually the swallow patrols open areas, including marshes, fields, lakes, and farms. The swallow builds its feather-lined, mud and straw nest onto the side of a barn, bridge or house.

Barred Owl: (L: 17" W: 44") Throughout the night, this big, gray-brown owl can be heard hooting "who cooks for you, who cooks for you-all?" Like other birds of prey, the barred owl hunts for live animals. Mice are its favorite, but it also tackles frogs, crayfish, fish, insects and small birds. The barred owl roosts and nests in swamps and deep woodlands but it often hunts in nearby fields. Sometimes, this owl takes over the sprawling stick nest of a hawk or squirrel, but it most often raises its young in the hollow of a tree.

Belted Kingfisher: (L: 13") This blue and white bird sports a broad blue belt across its breast. The kingfisher is most often seen perched above a lake, pond or stream. When it spots a fish, it dives headlong in the water. (See illustration on page 21) Occasionally, kingfishers take frogs, lizards, insects and clams. Their nests are located in burrows the kingfishers dig in the side of banks.

Canada Goose: (L: 25 - 43") This very large bird has a black head and a black neck. It can always be told by the white patch or "chin strap" that covers part of its face. In the breeding season, Canada geese are found mostly in lakes, ponds, marshes, and coastal bogs. This is where they feed on the seeds, leaves and roots of water plants. During migration, large flocks of geese often land to feed in farmland fields. In the fall and winter, geese take advantage of the scattered bits of grain left in the fields after harvesting. On the return trip in spring, they feed on the tender new shoots sprouting up in the fields. A Canada goose nest is usually located on the ground near water. It is a large, circular bed of sticks, cattails, reeds and grasses.

Eastern Bluebird: (L: 7") The bluebird wears the blue of the sky on its back and the reddish brown color of the earth on its breast. It is at home in open areas scattered with trees. Ideal habitats include wooded roadsides, orchards and fields dotted with or bordered by trees. During the summer, the bluebird feeds mostly on grasshoppers, beetles, crickets and caterpillars. Throughout the winter, bluebirds gather berries and seeds. The bluebird's nest is made in a hollow in a fence post or tree. Many times, an old woodpecker hole is used for nesting.

Brown Thrasher: (L: 11 1/2") This rusty brown and long-tailed bird can be told by its streaked underparts. The thrasher makes its home in open brushy areas, including hedgerows, brushy fields and woodland borders. Most often, the thrasher searches for food on the ground. With its feet, the thrasher kicks aside dead leaves and twigs. Then with its long, curved beak, it digs into the soil for beetles, ants, and crickets. Fallen berries, nuts and seeds are also gathered. The thrasher nest is located on the ground or in tangled vines, shrubs, and trees. Shaped like a large cup, the nest is made of leaves, twigs, stems, and strips of inner bark.

Common Bobwhite: (L: 8 1/2 - 10 1/2") This chunky quail can be identified easily by sound because it calls its name in a clear whistle, "Bob-white". On sight, the reddish brown bobwhite can be recognized by its short, dark tail and by its white throat and eyebrow. Birds of brushy, open country, bobwhites inhabit roadsides, hedgerows, woodland edges and farm fields. This is where they gather seeds, insects, leaves, and buds. To nest, a pair of bobwhites scratch out a shallow hollow in the ground. They line the hollow with grasses and to hide the eggs, they weave an arched cover of leaves and stems over it.

Red-breasted Merganser: (L: 22" W: 32") This darkly colored duck has a shaggy crest, a white collar and a rusty red breast. The merganser also has a long, saw-edged beak that is especially useful for grasping and pinning slippery fish. During the spring and fall, red-breasted mergansers migrate through Illinois, stopping to rest and feed on many of our larger lakes. Mergansers breed in areas to the north of Illinois, usually in and around freshwater lakes and rivers. The merganser nest is a scooped-out hole on dry ground.

PART 2. THE HABITATS OF THE POSTER BIRDS

A bird's habitat is its home. Within the habitat, a bird can find the things it needs to survive - food, water and cover. Like all bird species, the ten shown in the poster live only in certain types of natural habitats. Your task now is to determine the type or types of habitat each of the poster birds most commonly inhabits.

On the poster, three HABITAT SYMBOLS are shown in a box below the name and number of each species. The three symbols stand for three broad habitat types - forests, open country and wetlands. Take a moment to study the **Habitat Symbol Key** on the next page. Then, using the Poster Bird Descriptions as reference, circle the HABITAT SYMBOL on the poster that represents the habitat in which each bird most commonly lives. If a particular bird regularly inhabits more than one type of habitat, circle each of the appropriate HABITAT SYMBOLS.

HABITAT SYMBOL KEY

FORESTS
(the inner reaches of deciduous, coniferous and mixed woodlands)

OPEN COUNTRY
(fields, cropland, prairie, pastures, meadows, fencerows, hedgerows, shrubbery, woodland edges, brushy areas mixed with shrubs and trees)

WETLANDS
(all freshwater wetlands)

PART 3. THE FEEDING HABITS OF THE POSTER BIRDS

Within a natural habitat, many different kinds of food are available for birds and other animals. Your task here is to decide what kinds of food each of the poster birds most commonly eats.

The eight **FOOD SYMBOLS** below are also shown on the poster in a box beneath each bird's name and number. Study the symbols and what they stand for carefully. Then, using the Poster Bird Descriptions as reference, circle the FOOD SYMBOLS on the poster that best represent the types of food each bird gathers.

PART 4. THE NESTING HABITS OF THE POSTER BIRDS

Just as birds feed on different types of food, they also build and use different kinds of nests. Your job now is to list the type of nest each poster bird uses on a separate sheet of paper. To help you do that, carefully study the description of each bird's nest and review the Nest Guide in Chapter 1. If a poster bird's nest is similar to one of the types shown in the Nest Guide, list that type for that bird. If a poster bird's nest doesn't match any of the types in the Nest Guide, simply describe that bird's nest in as much detail as you can.

FOOD SYMBOL KEY

PLANTS (leaves, berries, nuts, seeds, etc.)

SNAILS, CRUSTACEANS, MOLLUSKS and WORMS
(includes crayfish and clams)

INSECTS, SPIDERS, BUTTERFLIES and MOTHS

FISHES

AMPHIBIANS (includes frogs, toads, salamanders, tadpoles)

REPTILES (includes snakes, lizards, turtles)

BIRDS

MAMMALS

PART 5. COLORING THE POSTER BIRDS

To finish your poster, color the birds according to the Color Key shown below. Also, color in the background habitat areas of the poster. You can use colored pencils or crayons. For the most accurate results, you may want to look at a color photograph or painting of the individual species. These you can find in many bird books and field guides.

COLOR KEY FOR POSTER BIRDS

These descriptions are for male birds in breeding plummage.

Barred Owl:
WHITE or LIGHT GRAY - the round areas in the face and all of the markings on the head, back, and wings.
BROWN - the eye and the rest of the body.
BROWNISH YELLOW - the beak.

Brown Thrasher:
WHITE - the two curved bars in the wing and all of the underparts except for the streaks on the breast.
BRIGHT RUSTY BROWN - the streaks on the breast, the top of the head, back of neck, wings (leave curved bars white), back, rump and tail (all of the upperparts).
YELLOW - the eye.
BLACK - the beak and legs.

American Kestrel:
BLACK - the eye, the two jagged bars on the side of the face, the spot at the back of the neck, the band across the end of the tail and the legs and feet.
DARK BROWN - the speckles and bars all over the body.
WHITE - the throat and the space between the two black bars on the side of the face.
RUSTY RED - the patch on the top of the head or crown, the back and the tail.
BLUE-GRAY - the wings and the curving band over the eye.
CINNAMON or PINKISH BROWN - the back of the side of the face, and the underparts except for the lower belly which is mostly white.
YELLOW - the legs.

Belted Kingfisher:
WHITE - the broad collar around the neck and throat, and the underparts except for the belt across the chest.
BLUE-GRAY - the head, the belt across the chest, the back, wings and tail.
BROWN - the eye.
BLACK - the beak.

American Redstart:
WHITE - the underside of rump.
ORANGE - the bar across the wing and the patches on the outside of the tail closest to the rump.
BLACK - the rest of the body, including the eye and legs.

Common Bobwhite:
WHITE - the curved band over the eye, the triangular patch at the throat.
DARK BROWN - the eyes, legs, feet, the jagged band running from the eye to the neck, the tail, and all of the bars and speckles.
RUSTY BROWN - the breast, shoulder, back, wings and rump.
TAN - all of the underparts except for the breast.

Eastern Bluebird:
RUSTY REDDISH BROWN - the throat, breast, upper belly and flanks (sides).
WHITE - the lower belly.
BLUE - the head, back, wings and tail.
BLACK - the eye, beak and legs.

Barn Swallow:
RUSTY BROWN - the forehead and the area along the chin and throat.
CINNAMON or PINKISH TAN - the belly and sides.
BLUE-BLACK - the head, back, wings and tail.
BLACK - the beak.
DARK BROWN - the eye.

Red-Breasted Merganser:
BLACKISH GREEN - the head.
BLACK - the back of the neck (leave the patch on the throat white), the shoulder area (leave the speckles white), the speckles on the breast, and the top of the back down to the rump.
WHITE - the patch on the throat, the long triangular area between the belly and the top of the back, and the speckles in the shoulder area.
RUSTY BROWN - the breast area. DARK GRAY - the upperside of the tail.
LIGHT GRAY or OFF WHITE - the belly, sides, and underside of tail.
RED - the eye and beak.

Canada Goose:
BLACK - the beak, eye, head, neck (leave the patch along side of face and chin white), legs, feet and tail.
WHITE - the "chinstrap," and the underside of the rump.
BROWN - the bars on the breast, sides and belly, the back and wings (color the bars on the wings tan).
LIGHT GRAYISH BROWN - the chest, sides and belly.

CLASSROOM DISCOVERY POINTS ____

If I Were A Bird

YOUR QUEST

Sing a song about birds.

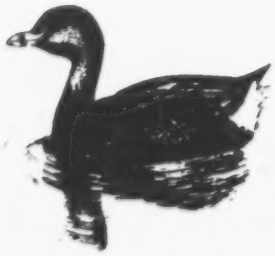
INSTRUCTIONS

Shown below is a special song you and your classmates can sing to the tune of **"If I Had A Hammer."** After you have worked with the song for a while, you may want to write and sing some new verses.

What new verse could you write for a woodpecker like the northern flicker?

If I Were A Bird

If I were a swallow,
I'd fly at dawn,
I'd fly in the twilight,
All over this land,
I'd fly like lightning,
I'd fly without stopping,
I'd fly for bugs and beetles and bees,
All, all over this land.



If I were a duck,
I'd swim in the early mist,
I'd swim at day's end,
All over this land,
I'd swim across lakes,
I'd swim down rivers,
I'd swim for seeds, and leaves and roots,
All, all over this land.

If I were a bluebird,
I'd sing in the morning,
I'd sing at tea-time,
All over this land,
I'd sing out boldly,
I'd sing with beauty,
I'd sing out spring to all my brothers and sisters,
All, all over this land.

If I were an owl,
I'd hoot at midnight,
I'd hoot at daybreak,
All over this land,
I'd hoot like thunder,
I'd hoot all winter,
I'd hoot out life to all the night-time creatures,
All, all over this land.

If I were an eagle,
I'd soar at sunrise,
I'd soar at sunset,
All over this land,
I'd soar freely,
I'd soar forever,
I'd soar for peace between you and me,
All, all over this land.

CLASSROOM DISCOVERY POINTS ____

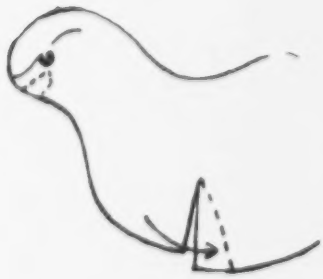
Building a Flying Bluebird Model

YOUR QUEST

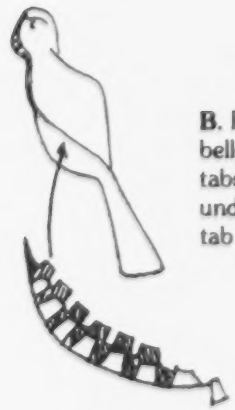
Put together a paper model of a flying eastern bluebird.

INSTRUCTIONS

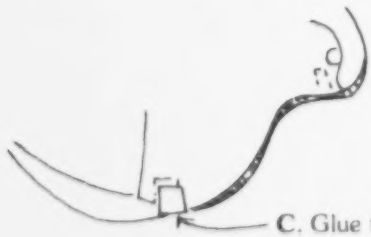
1. Using white paste, glue the bluebird pattern on the next page onto a sheet of construction paper.
2. With crayons or colored pencils, color the pattern pieces according to the coloration of the eastern bluebird. (For a description of the colors on the eastern bluebird, see the COLOR KEY in the previous exercise.)
3. Once you have colored all of the pattern pieces, follow these steps as you cut and assemble the model. ***Please be sure to cut on all solid heavy lines, fold the tabs on dotted lines.***



A. Glue body flap over to the dotted line, making the bird bulge.

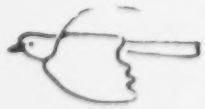


B. Fold all of the tabs on the belly piece in. Apply paste to the tabs and glue the entire piece under the bird. Glue the "O" tab under the tail.

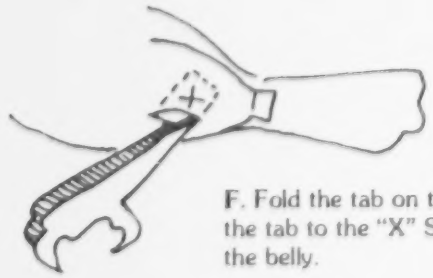


C. Glue tab on breast of bird to section "A".

D. Glue the flaps at the front of the wings to make wings "bulge" a little.



E. Put glue on tabs "B," "C," and "D" to glue wings to the back. Hold until stable. The wings do not need to be folded.

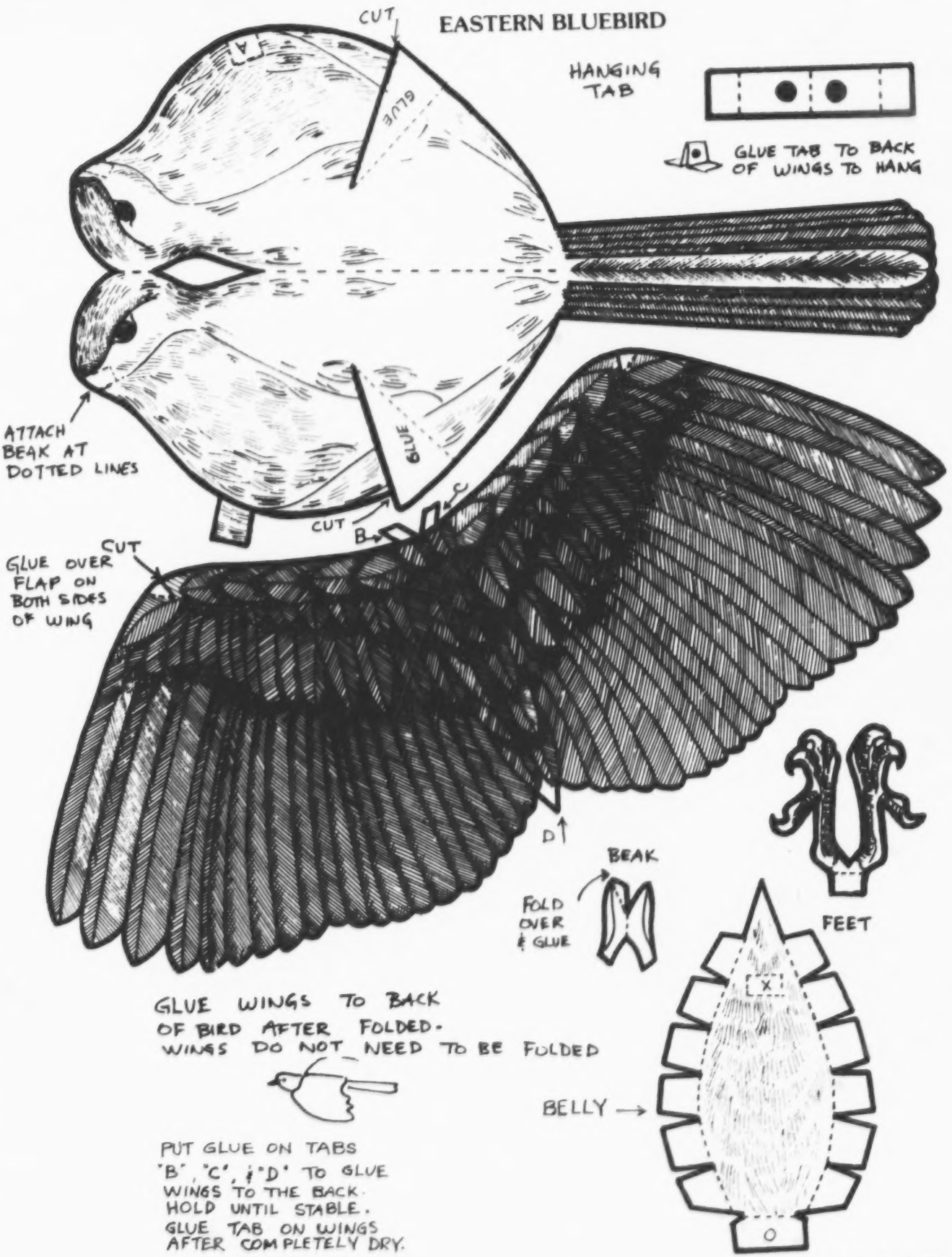


F. Fold the tab on the feet. Glue the tab to the "X" Section on the belly.

G. Glue the beak over to the dotted line.

H. Glue the beak onto the head on the dotted lines shown on the head.

I. Glue the hanging tab to the back of the wings. Punch a hole through the solid black circle.



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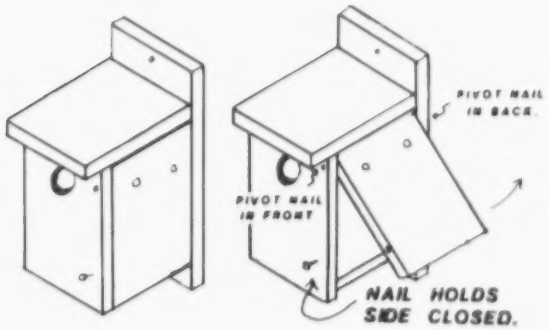
OUTDOOR DISCOVERY POINTS

Constructing A Bluebird Nesting Box



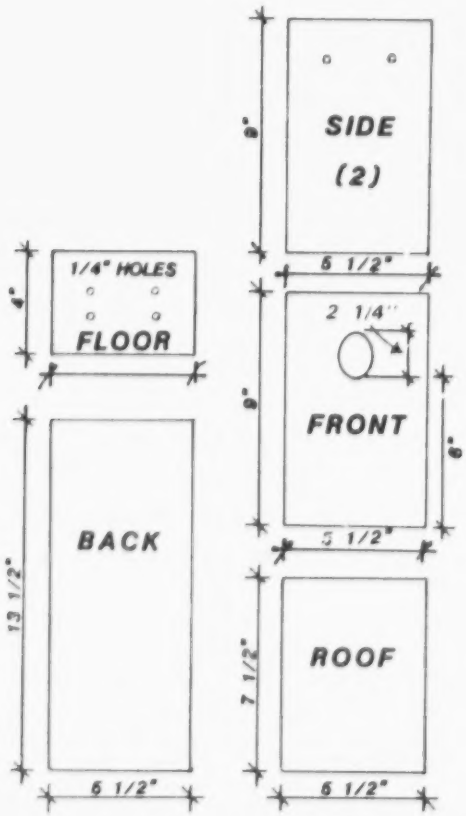
TWO "PIVOT" NAILS ALLOW SIDE TO SWING OUT FOR CLEANING.
USE ONE NAIL AT BOTTOM TO CLOSE SIDE.

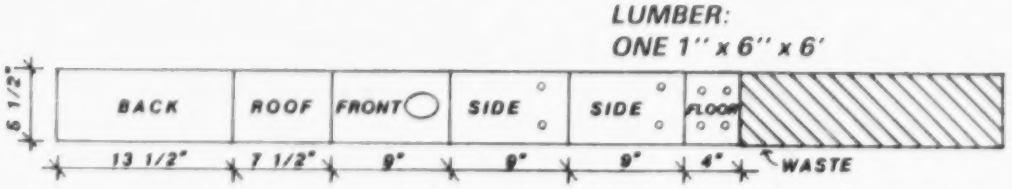
YOUR QUEST

Using the plan below, build and place a nesting box for eastern bluebirds.

INSTRUCTIONS

1. Study carefully the construction plan and gather up the necessary materials and tools. These include one pine board (1" x 6" x 6'), some four penny common nails, a hammer, a drill, two wood-boring bits (1 3/8" and 1/4"), a chisel or key-hole saw, and a regular saw.
2. Cut the pine board into the lengths shown. Label the pieces with a pencil.
3. In the front piece, drill an entrance hole with a 1 3/8" wood- boring bit. With a key-hole saw or chisel, extend the top and lower edges of the hole until it is in the shape of an oval 2 1/4" long.
4. In the side and floor pieces, drill the air holes indicated with a 1/4" wood-boring bit.
5. Nail the box pieces together. The "pivot" nails in the front and back pieces should be directly opposite each other, creating a type of hinge. Use only one nail at the bottom to close the right side. Also, pound that nail part-way into the side so it can be pulled out when the box is opened for winter cleaning.
6. Prior to late March, place your completed box on a free- standing post in a habitat area suitable for bluebirds. The entrance hole should face north, east, or northeast. Ideal habitats include wooded roadsides, orchards, and fields dotted with or bordered by trees. Bluebirds will sometimes nest in the backyards of homes in rural areas or on the fringe of urban areas.
7. If you and your classmates would like to create a bluebird trail, place five or more boxes 100 yards apart along a road or fenceline.





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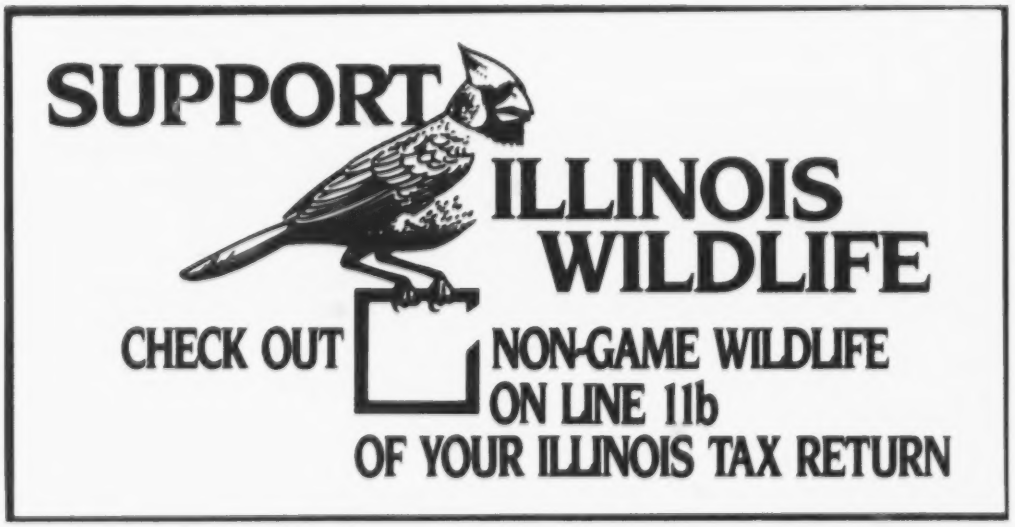
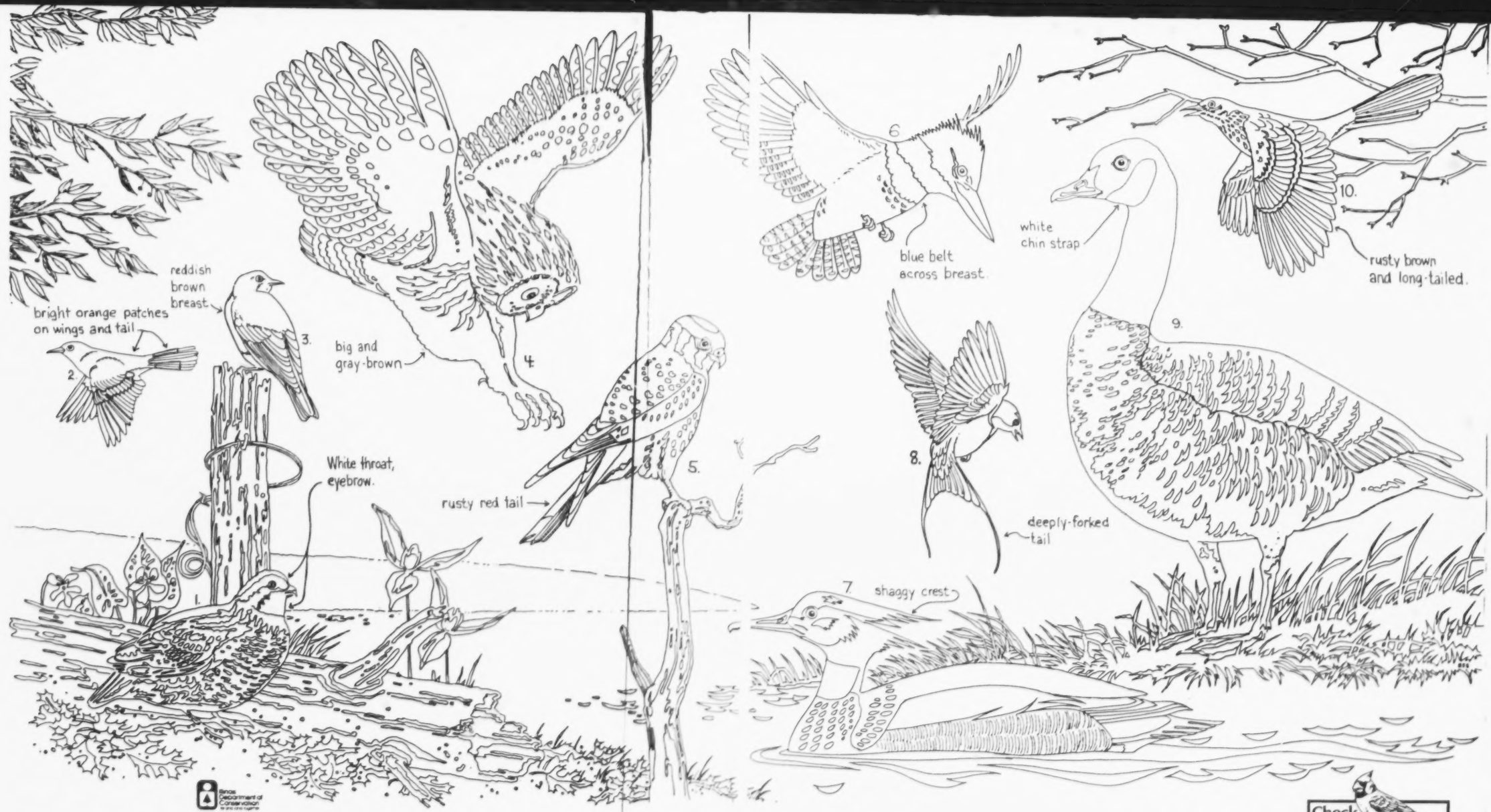
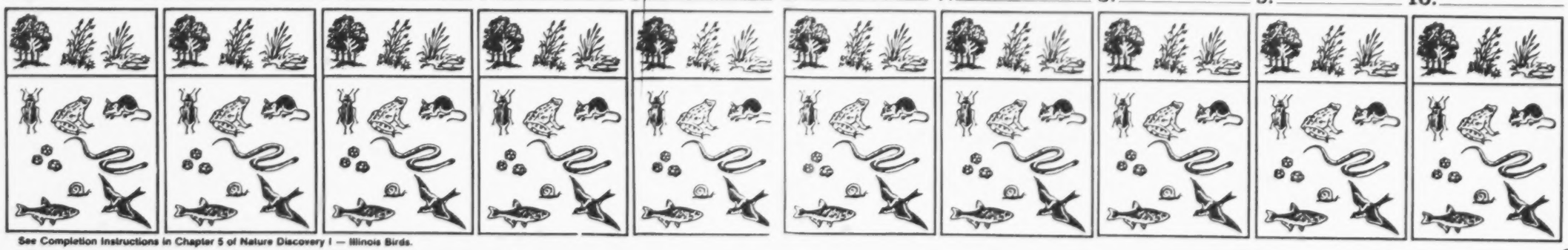

SUPPORT
ILLINOIS
WILDLIFE
CHECK OUT
NON-GAME WILDLIFE
ON LINE 11b
OF YOUR ILLINOIS TAX RETURN



ILLINOIS IS A HOME ADDRESS FOR:

1._____ 2._____ 3._____ 4._____ 5._____ 6._____ 7._____ 8._____ 9._____ 10._____

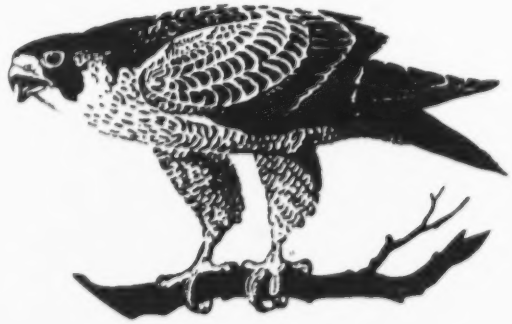


Check Us Out Line 11b

Look for the Nongame Wildlife Checkoff on your IL 1040

See Completion Instructions in Chapter 5 of Nature Discovery I — Illinois Birds.

Illinois Nature Discovery I



Certificate of Achievement

In recognition of your quest for knowledge of birds and their natural habitats, the Illinois Department of Conservation hereby awards you this Certificate of Achievement. Only through an understanding of nature, can we know how to safegaurd a healthy environment in which all forms of life can flourish. May your quest for discovery continue always!

Michael B. Witte *Director*

Illinois Department of Conservation
life and land together

YOUR NAME _____ DATE _____

LOCATION _____

Discovery Point Totals

CLASSROOM POINTS ____

OUTDOOR POINTS ____

GRAND TOTAL ____

Cut along line after completing Nature Discovery.